products finishing

DECEMBER
1960

finishes on metal products

Steel Panels for Buildings Move Down New Color Coating Line at Stran-Steel

. . . see page 30

able of Contents. . . . . page 5

34¢ per part may be economical!

12/3¢ per part may be too much!

what does your metal cleaning cost?

You may be looking at cleaning department costs and saying: "that looks about right . . . it used to cost us a lot more!" Would you like to know, for sure, that your cleaning costs are just as low as they can be . . . with excellent results?

Many present day users of Cincinnati Cleaning machinery thought their former methods were modern . . . their costs low . . . their production high – until a Cincinnati cleaning unit proved savings of 60, 66, 75 and 81 percent in time and labor . . . along with production increases up to 200 percent!

The Cincinnati Cleaning service that led to these savings is available to you . . . without cost or obligation! Use the handy coupon for complete details.

Cincinnati CLEANING & FINISHING MACHINERY C
2008 Hageman Street, Cincinnati 41, Ohio

☐ Have a Cincinnati engineer point out time and labor savings and production increases in our cleaning.

☐ Send literature on Cincinnati cleaning equipment.

company .....

address .....

city ..... state .....

name .....

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For what's new in cleaning/phosphating

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS

OAKITE CrysCoat® 187

NEW—cleaning/phosphating process—FOR TANKS!

Now, by the tank-immersion method, you can get cleaning/phosphating efficiency comparable to pressure spray washing—with new CrysCoat 187.

This remarkable Oakite CrysCoat formula does two jobs in one. Its special detergent and solvent action removes a variety of smuts and shop soils . . . then CrysCoat 187 converts steel surfaces to a dense phosphate layer that walls out rust . . . bonds paint tightly.

CRYSCOAT 187 SAVES YOU TIME. It cleans and phosphates soiled parts in three to ten minutes. No time lost in mixing powders, either, because CrysCoat 187 comes in liquid form. Too, pH control is maintained quickly, easily.

CRYSCOAT 187 SAVES YOU MONEY. Gives you smoother iron phospate coating, calculated to soak up less paint than coarser phosphate layers. Solution life is longer, too.

CrysCoat 187 is the latest member of an entire family of Oakite CrysCoat processes. Each is designed to fill your special requirements. Ask your local Oakite man to "job-match" a CrysCoat material to your needs. Or send for FREE bulletin. Write Oakite Products, Inc., 20 Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

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years' leadership in industrial cleaning

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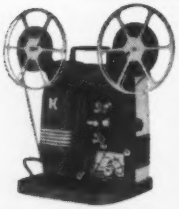
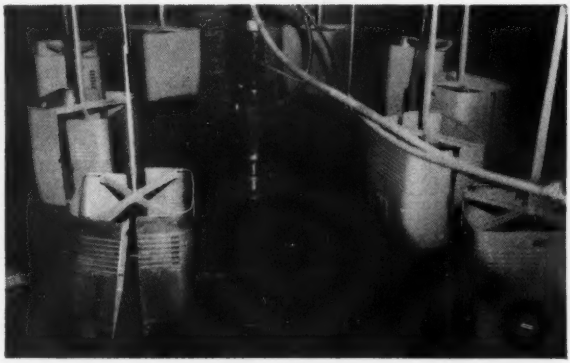
KEYSTONE CAMERA Relies on

RANSBURG No. 2 Process

Electrostatic Spray Painting



to get the high quality wrinkle finish on cameras and projectors



Projector covers rotate as the conveyor makes a loop around the ceiling-mounted Ransburg No. 2 Process reciprocating disk. Electro-Spray is providing large paint savings on this wrinkle application, and permits Keystone to meet increased production requirements.

Keystone Camera Company, Inc. adheres to a strict quality control program—from start to finish—in the production of their widely-distributed, high quality home movie products. That's one reason for using the Ransburg No. 2 Process to apply a uniform wrinkle finish on their cameras and projectors.

IMPROVED QUALITY AND LARGE PAINT SAVINGS TOO

Together with the improved quality and greater uniformity in their finish, Keystone reports large paint savings over former air hand spray. Rejects which used to run 7%, or more, are reduced to less than 1%. Too, Ransburg No. 2 Process has enabled their finishing department—often a bottleneck in production—to meet steadily increasing production requirements without resorting to expensive overtime. Now, with the automatic No. 2 Process, they can turn out more projector covers in an hour than one operator formerly painted in a day. And, assembled cameras are painted five times faster with Electro-Spray. As a result of these desirable advantages—coupled with even higher production schedules—another Ransburg No. 2 Process unit was authorized for a second, identical production line at Keystone.

RANSBURG

NO REASON WHY YOU CAN'T DO IT, TOO

Let us show you how Ransburg No. 2 Process can improve the quality of YOUR painted products, and at the same time, cut YOUR paint and labor costs. Send for our No. 2 Process brochure. Or, if your production doesn't justify automatic painting, let us tell you about the No. 2 Process Electrostatic Hand Gun which can be used in either conveyorized or non-conveyorized painting.

RANSBURG Electro-Coating Corp.

Box 23122, Indianapolis 23, Indiana

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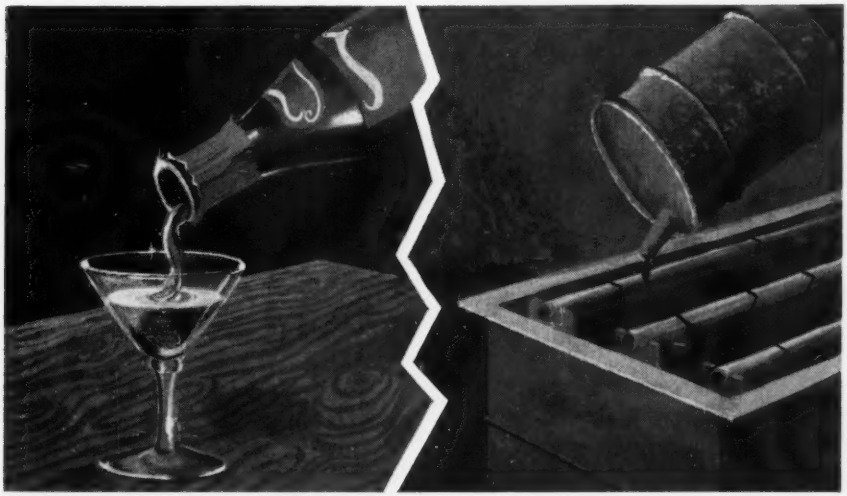
ROHCO® SUPPLIES THE BRIGHT ZINC MAKINGS



As easy to use as a cocktail mix! Just add a little ROHCO Zinc Brightener to your conventional zinc plating bath . . . and just that easy you get bright chrome-like zinc at only ½ % more than the cost of ordinary zinc plating!

ROHCO 102 BARREL

For 3-D depth in a mirror-like finish. Exhibits high covering power that puts substantial thickness of deposit in recesses usually unplated. Your customer will notice the difference, too.

ROHCO 503 STILL OR BARREL

Gives jewel-like bright zinc deposits with minimum effort or expense. Ideal for large tanks or where one brightener is desired for all bright zinc baths.

With the mounting demand for bright zinc plating why not spare yourself the trouble and expense of trial and error? Why not use ROHCO Bright Zinc "makings" for consistent and dependable results? Call your ROHCO Representative, today!

ROHCO

Nationwide Stockpoints

R. O. HULL & COMPANY INC.

1304 Parsons Court • Rocky River 16, Ohio

The RIGHT START . . . a BETTER FINISH

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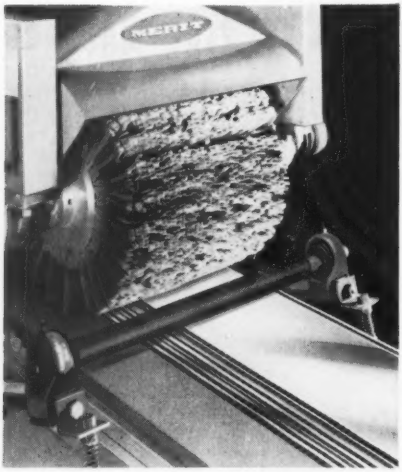

New Polishing Wheel Cuts Costs 75%

An automatic operation using a new type grinding wheel for polishing extruded aluminum parts has slashed labor costs 75% for Aluminum Skylight & Specialty Corp. of Los Angeles.

The new wheel, Type B Flex-Drum, made by Merit Products, Los Angeles, has a series of coated abrasive flaps that are spaced slightly apart to lend resilience, and are slashed into tiny filaments. When the wheel rotates it resembles a rotary brush coated with abrasive.

Joseph D'Angelo of Aluminum Skylight points out that the tendency now in metal finishing is to abandon the old mirror-type polish and go into satin or brushed finishes. The Flex-Drum wheel has proved ideal for this work, he says, and delivers continuously uniform finish with the scratch pattern remaining the same throughout the life of the abrasive element.

As the wheel wears down, a constantly new, sharp abrasive surface is presented. When worn, the segments are simply removed from the hub and new ones slipped in. A different size hub is used for each size wheel desired, with a proper arbor hole for mounting. The hub lasts indefinitely.

Aluminum Skylight uses the set-up for finishing aluminum exterior architectural members that go into many outstanding modern buildings such as the Riviera Hotel in Las Vegas.

Other applications include the new Broadway department store in Lakewood, Security First National Bank in Hollywood and the UCLA Medical Building in Los Angeles.

D'Angelo says he can operate the wheel for hundreds of hours without any change or adjustment of the abrasive. Unlike methods previously used, the wheel does not "load up" or clog in continuous aluminum finishing, thus eliminating down time. The unit can be operated by a comparatively inexperienced operator, D'Angelo says.

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products finishing

Vol. 25 No. 3 December, 1960

FEATURES IN THIS ISSUE:

29 *Season's Greetings*

30 *Stran-Steel's Color-Coating Process* • By Gerard H. Poll, Jr., Associate Editor

50 *Control of Chromium Plating Baths* • By Joseph P. Branciaroli

56 *Infrared Oven Speeds Finishing of Kitchen Cabinet Doors*

58 *Douglas Aircraft Installs Large Hard-Coat Anodizing System*

62 *Stain-Free Drying of Metal Parts* • By Edward Plassmeyer

66 *Editor on Tour: Osaka, Japan; Taipei, Taiwan (Formosa); Hong Kong; Tokyo, Japan* • By Ezra A. Blount, Editor

100 *Five-Stage Cleaning Beats "Burn-Off" for Economy*

169 *1960 Article Index*

6 *Advertising Representatives*

DEPARTMENTS:

94 *Spotlighting Finishing Progress* • By Dr. Nelson F. Murphy
94 *—Electrophoretic Deposition*
102 *New Equipment, Materials, Processes*
138 *Free Literature*
151 *Classified Advertising: Positions Available; Used Machinery; Professional Cards; Services*
153 *News of the Finishing Industry*
167 *Meetings of Interest to Finishers*
168 *Metals Memos*
174 *The Finishing Touch*
176 *December Advertisers' Index*

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contents

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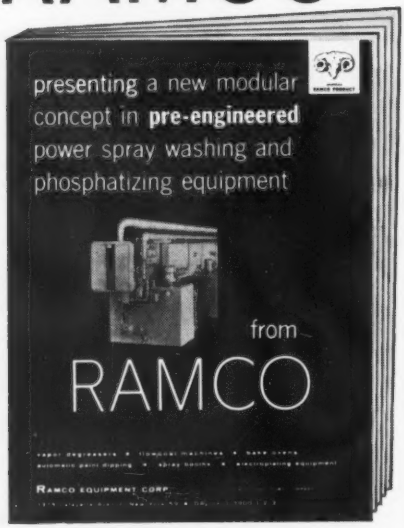
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Model "K" Hammond Automatic Finishing Machines are made in 34", 46" and 62" table sizes. These models are either continuous or for indexing at 150 to 1700 indexes per hour. Head styles include floating, non-floating with 3 H.P. to 20 H.P. range. Also available are attachments for converting heads from buffing to abrasive belt polishing. The Hammond Model "K" will speed up your grinding, polishing, buffing, brushing and de-burring operations. Send us samples and learn how much you can speed them up.

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chrome plating is our goal for you!

Here, at Diamond, our plating specialists strive constantly to raise the standards of chrome plating.

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Diamond Chemicals

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Entrance of the two 900 foot Burdett ovens in the Chrysler Plant, showing the continuous line of Burdett 10-L Burners along each side.

BURDETT FINISHING SYSTEMS do the JOB!

Chrysler ("America's Best Built Automobile") is a quality car throughout, and its good looks must be far more than skin deep. Its brilliant finish must *endure*. That's why Chrysler uses the Burdett Finishing System. Burdett Radiant Heat actually "welds" the finish to the metal; it's there to stay, and what's more the Burdett 10-L Radiant Heat Burners save 30% to 70% in heat processing costs, compared with conventional methods. Operation temperature at refractory maintained at approximately 2300 F. with only a radiant glow and no flames discernible.

Whether you need a complete finishing system, an addition to your present layout or the renovating of your old system, Burdett engineers can help you. Write today.

BURDETT

MANUFACTURING COMPANY 4920 SOUTH MONITOR AVENUE CHICAGO 38, ILLINOIS

COMPLETE FINISHING SYSTEMS FEATURING RADIANT HEAT COMBUSTION

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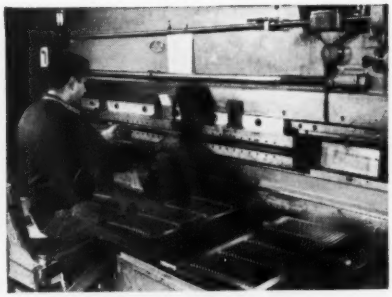
Superior Pre-Paint Protection Racks Up More Sales,

Paint Adhesion of Air Conditioning and Heating Registers, Grilles and Diffusers Insured by Granodine



Precision forming equipment turns coil stock steel into product at Krueger plant.

At major parts producer, Krueger Air Conditioning Corporation, registers, grilles and diffusers are treated with Amchem Granodine before painting to provide them with what Krueger officials agree is a "superior finish that extends the life of our products."

FINISHING PROBLEM SOLVED

Before selecting Granodine as their standard phosphating treatment, Krueger had tried several competitive processes but were unable to sustain the final quality or eliminate rust from painted products. The results—customer complaints and rejects running up to 10 percent of total production.

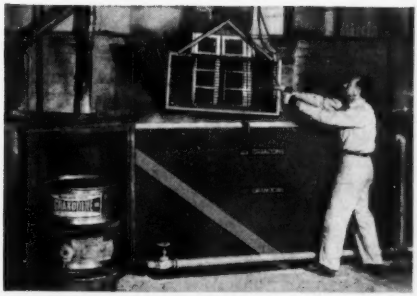
Today, after three years of utilizing Granodine in a five-stage dip phosphating process, Krueger, one of the world's largest manufacturers of registers, grilles and diffusers reports virtually no rejects, increased volume and an all-around better paint finish.

Krueger management-manufacturing team: Left to Right—J. B. Smith, Vice-President of Production; President Leo Krueger; and Ted Kleckner, Vice-President and Comptroller.

COMPARISONS SELL

To tell their superior finish story Krueger

# of Amchem GRANODINE*
Fewer Rejects For Krueger



Operator employing electric hoist, lowers load of Krueger products into Granodine dip tank.

Paint line conveyor carries painted Krueger products from water-washer spray booth to inspection area.

sets up effective side-by-side demonstrations of untreated products and products treated with Granodine at heating trade shows. Customer interest in such displays is high and has led to more sales through graphic illustration of competitive advantages on Krueger's part.

NEW SYSTEM PLANNED

Looking to the future, Krueger is currently adding a new 10 acre, 100,000 square foot plant. High on the planning list is a new and virtually completely automated Granodine line. Amchem engineers have designed a unique conveyorized system utilizing overhead cleaning, rinsing and coating of Krueger products which will achieve significant cost savings and substantial reduction in gas consumption through a colder method in the clean-coat phase of the process.

If you are interested in a *superior finish* for steel products—it will pay you to investigate Granodine, the *superior phosphating* process.

Write for Bulletin 1380B containing detailed information on Granodine for steel . . . the finish that lasts.

*Granodine is Amchem's registered trademark for the conversion coating chemical used to produce phosphate coatings on steel.

AMCHEM® GRANODINE

Amchem is a registered trademark of **AMCHEM PRODUCTS, INC.** (Formerly American Chemical Paint Co.)

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McGinchley McBatt is the name of this hero—
A plater who plates by the **DARCO®** *Plan—*
He's cut down his rejects to practically zero,
And his profits have soared since the Plan he began.

Red Label DARCO S-51—the only activated carbon made especially for plating solutions—saves anode metal, improves plating results, and reduces rejects to a minimum. The DARCO Plan (pre-coat filtering once a month, twice-yearly purge) keeps your plating bath clean without shut-down. Write for "Modern Activated Carbon Practices"—and order Red Label DARCO S-51 from your distributor.

DARCO IS MADE BY ATLAS

CHEMICALS DIVISION
ATLAS
POWDER COMPANY
WILMINGTON 99, DELAWARE
In Canada: **Atlas Powder Company, Canada, Ltd., Brantford, Ontario, Canada**
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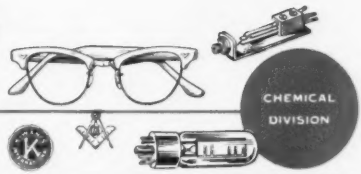
corrosion-resistant rhodium plating for electrical and decorative applications

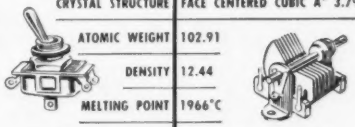


CHEMICAL DIVISION

Rhodium is ideal for plating a decorative finish on many types of jewelry, optical goods, instruments, reflectors and equipment. It provides a hard, brilliant-white, non-tarnishable, highly reflective surface that is extremely resistant to corrosion. It adds to the product sales appeal.

The properties of Rhodium are also very well-suited to many electrical and electronic applications. In general, Rhodium improves efficiency whenever a low-resistance, long-wearing, oxide-free contact is required. Rhodium plate assures low noise level for moving contacts, no oxide rectification, low and stable contact resistance. Rhodium plated slip rings and commutators show negligible wear. The positive action of plated contacts subjected to long periods of inactivity emphasizes the efficiency of Rhodium for safety alarm contacts. Excellent protection against atmospheric corrosion is obtained for printed circuits by plating Rhodium over nickel to assure long wear and low noise, or Rhodium over Silver to protect against tarnish and corrosion.

CRYSTAL STRUCTURE	FACE CENTERED CUBIC A° 3.7954
ATOMIC WEIGHT	102.91
DENSITY	12.44
MELTING POINT	1966°C
COEF. OF LIN. EXPANSION	8.19 X 10 ° 0°C. PER °C
THERMAL CONDUCTIVITY	(0°C) 213 C.G.S. UNITS
REFLECTIVITY ELECTROPLATE	78% AT—620 MU
HARDNESS ELECTROPLATE	540-640 V.H.N. 20 GRAM LOAD



Send for literature.

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a simplified mirror-bright silver plating process

Here is the most efficient, simple procedure to produce mirror-bright silver plate, finished directly—through a complete range from flash to heavy deposit. It is being used with outstanding success for all types of jewelry and hollow ware. The procedure is easy, economical and non-critical—with little or no polishing required. Silva-Bright is a clear, water-white solution, enabling the operator to observe work as it is being plated. Uniformly good results are attained with current densities ranging from 10 to 40 amperes per square foot. Normal room temperature operation minimizes fumes and tendency toward bath decomposition. Send for descriptive data together with detailed plating procedures.

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PROMPT PRECIOUS METAL SCRAP RECOVERY SERVICE • ENGELHARD PROCEDURES RECOVER 100% OF ASSAYED PRECIOUS METAL CONTENT • IRVINGTON-BAKER REFINING DIVISION

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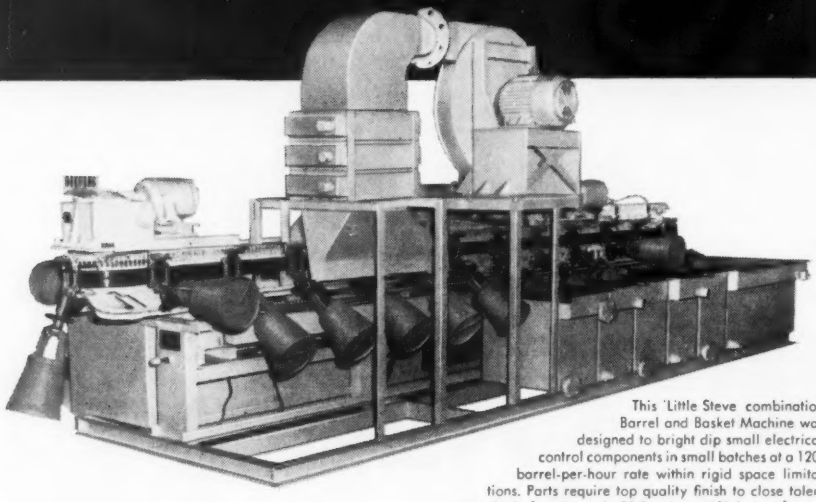
Now there's a member of the famous 'LITTLE STEVE' family to handle ALL your plating and processing jobs!



This 'Little Steve' combination Barrel and Basket Machine was designed to bright dip small electrical control components in small batches at a 120-barrel-per-hour rate within rigid space limitations. Parts require top quality finish to close tolerance; 'Little Steve' is only 23 feet long, 6¾ feet wide and normally, 4 feet high. Special built-in dryer shown is an optional feature.

'Little Steve' automatic barrel machines

Now you can precision plate and process small, intricate parts automatically with the new, low-cost 'Little Steve' Barrel Machine. Floor space requirements are kept to a minimum. Fully automatic cycling, as well as automatic loading and unloading features, provides fast, efficient processing of parts to meet your specific requirements. Stevens popular oblique barrels eliminate the need to open and close covers manually.

This completely new addition to the famous 'Little Steve' family of automatic processing equipment is ideally suited to integrated manufacturing methods. Investigate its many benefits today.

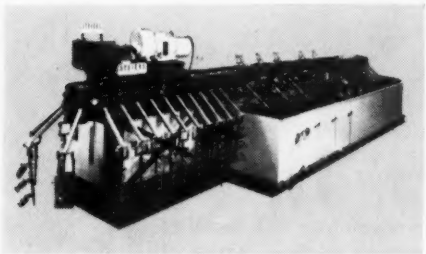
And every 'Little Steve' is designed to give you profitable, high-volume parts finishing capacity in a minimum of space, plus...

- ...low initial investment including installation
- ...floor-level accessibility without catwalks or ladders
- ...ready adaptability to new, integrated manufacturing methods
- ...proven design simplicity and smooth, dependable operation
- ...exceptional flexibility to meet all your plating and processing requirements

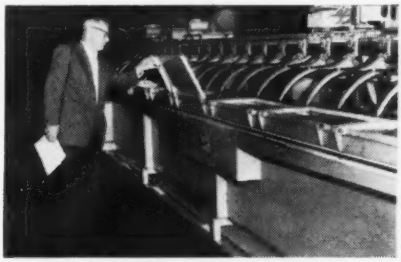
'Little Steve' rack machines

For the economical plating or processing of larger pieces, 'Little Steve' Rack Machines offer BIG performance in the smallest possible area. Originally designed to fill the gap between manually operated tanks and large automatic equipment, 'Little Steve' has permitted many manufacturers to automate their parts processing without a great capital investment.

Completely flexible in design and operation, 'Little Steve' can be easily adapted or relocated to meet your changing processing requirements. See how you, too, can realize greater profits from your parts production. Write for complete information on versatile, low-cost 'Little Steve.'



Also new . . . 'Little Steve' with Vertical Lift, or traveling hump cam action, is the truly compact member of the 'Little Steve' family. Narrower tanks save space, cut solution cost. Recommended for production rates under 100 racks per hour. Note convenient height for servicing or rack removal.



'Little Steve' with conventional stationary hump cam action offers amazing capacity in relation to its size . . . up to 400 racks per hour on normal plating production. This 'Little Steve' will efficiently handle a wide variety of racks or, if desired, a single part can be placed on each carrier arm.

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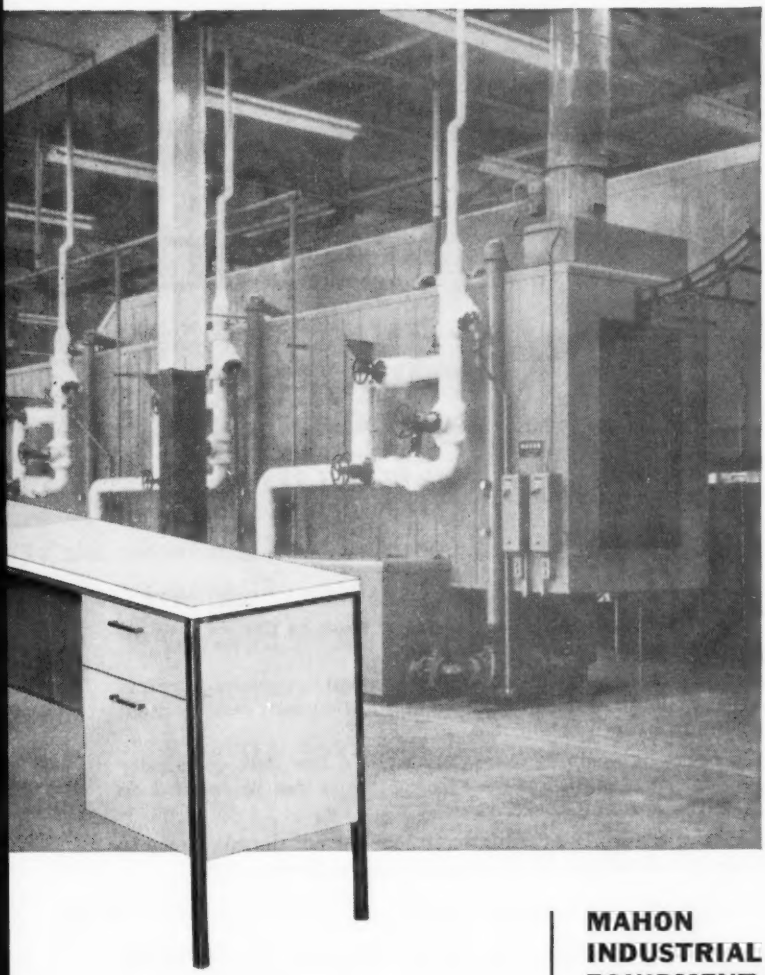

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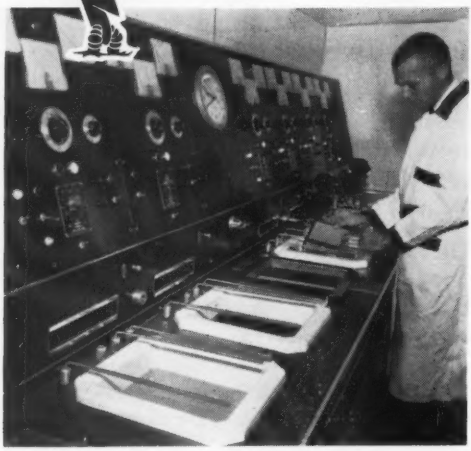

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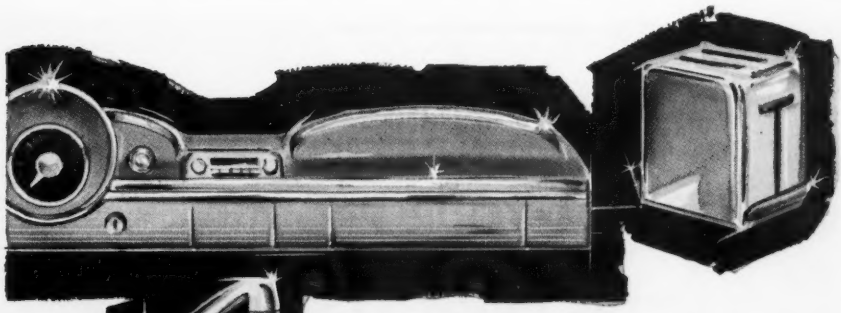

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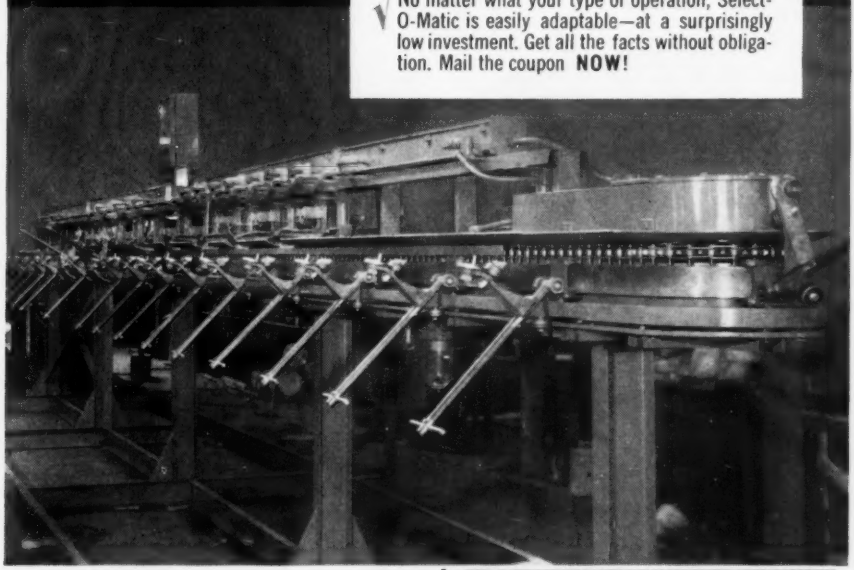

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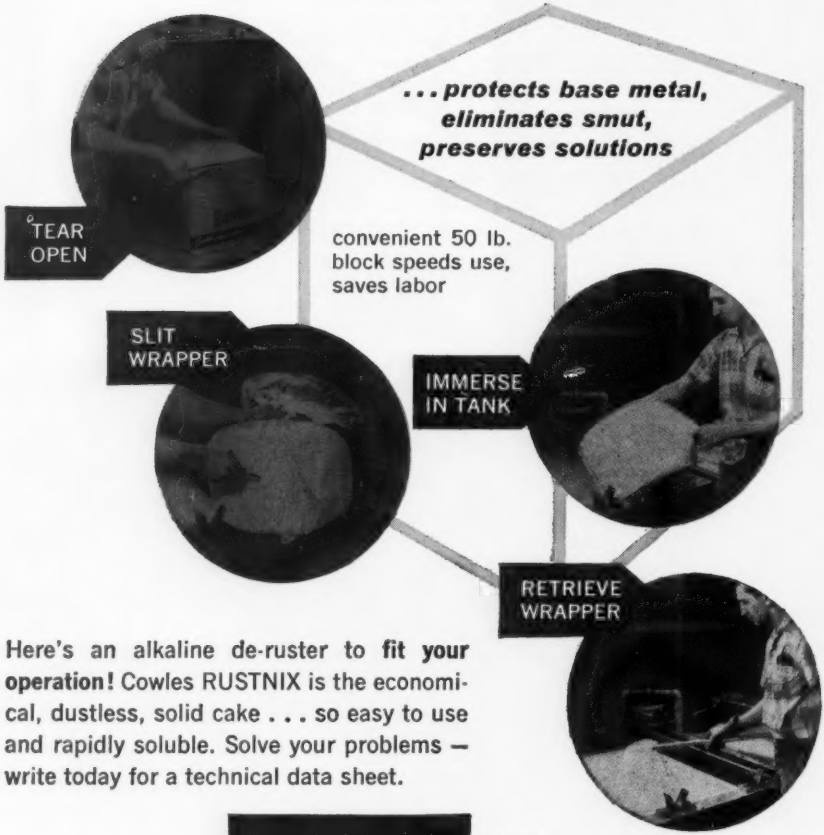
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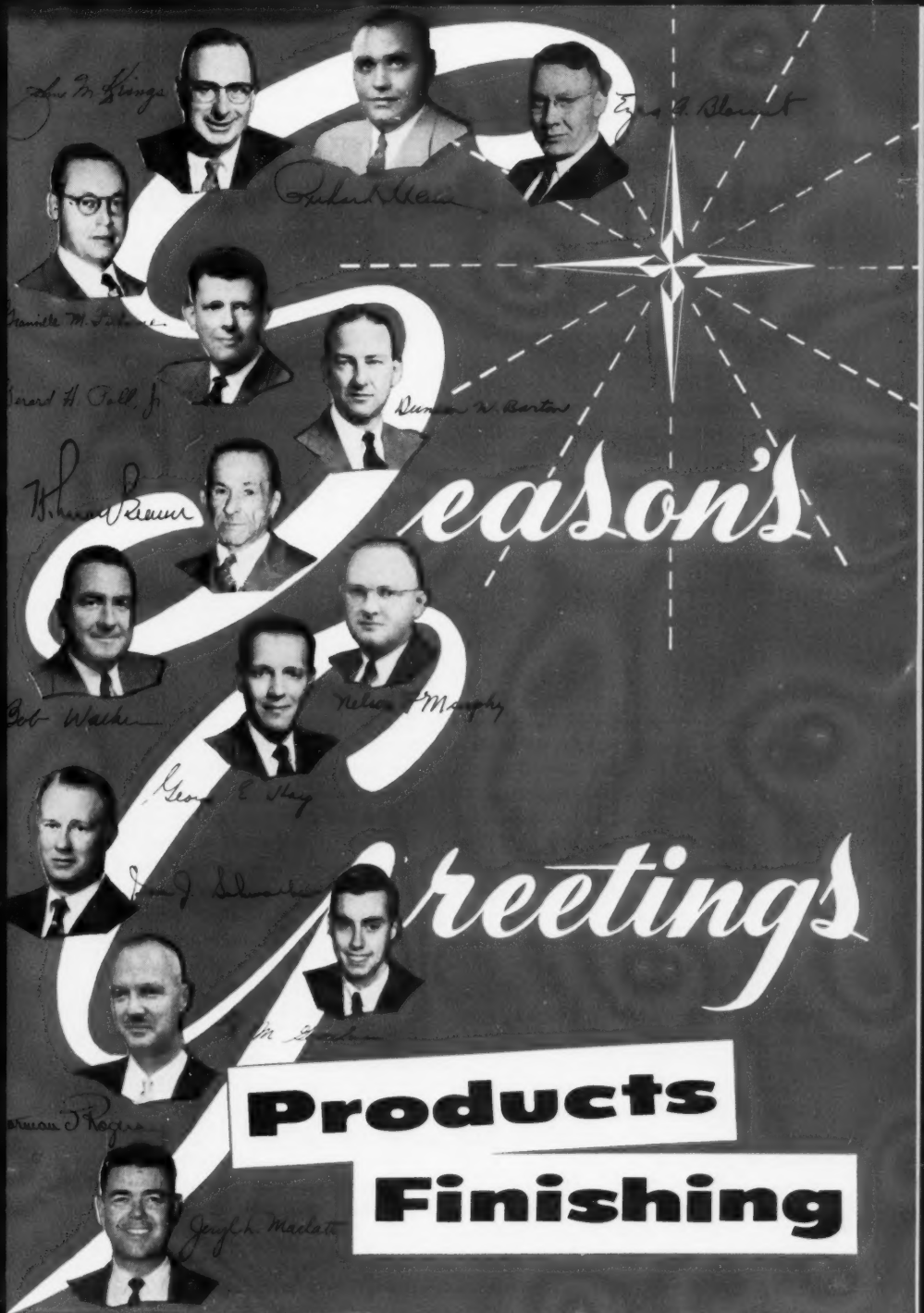
Season's
Greetings
Products
Finishing

Stran-Steel's Color-Coating Process

A 600-foot automatic line colors galvanized roofing and siding with a tough, adherent baked finish that's lower in cost than painting on the construction site and much more durable in service . . .

By GERARD H. POLL, JR.
Associate Editor

Stran-Steel's progress is a tribute to the importance of color; for color has been the key that unlocked the door to new markets for this company's product: pre-engineered steel buildings (Fig. 1). The colored coatings now brightening its steel siding and roofing panels have revived this company's once declining sales. That's why the people at Stran-Steel are excited these days. The company's Terre Haute, Indiana, plant is once again a bustling, expanding operation, as it was in the days of World War II.

This subsidiary of National Steel Corp. began making pre-engineered steel buildings more or less by accident, or possibly by necessity. Stran-Steel's wartime job was building Quonset Huts (Fig. 2). The Terre Haute plant made these simple structures with the famous curved roof by the thousands, shipped them out for use in every war theater.

Stran-Steel had no real plans for building them after the war. But to the company's surprise, demand for the wartime Quonset continued strong long after the war. Quonsets dotted the landscape as farm buildings, used car shelters, fruit stands, service stations and warehouses.

From 1944 to 1951, Stran-Steel was one of the country's biggest volume producers of steel buildings. In the fifties, however, other producers cracked this market with buildings that put the old Quonset in a bad way, competitively speaking. Stran-Steel had to admit that its product was becoming obsolete.

A rather bleak period followed while Stran-Steel geared its plant and organization to designs, marketing and production methods that put it back in active competition with the volume producers of steel buildings.

Big changes took place at Stran-Steel—expansion of engineering staffs, programs for new designs, product research and development, a multi-million dollar investment in new plant and equipment.

Big changes came about in product, too. Stran-Steel's design (designer Harley Earl of General Motors fame is the design consultant) and engineering advances have moved its buildings beyond the farm and factory backyard to Main Street—auto dealerships, office buildings, stores and commercial buildings. In the process, the steel building concept of construction has become one of the most dynamic growth areas in our economy and is providing more and more outlets for an abundant supply of steel. Industry sales in 1960 are expected to account for more than 250 million dollars in steel at mill prices. Sales of pre-engineered steel buildings have increased 25 per cent annually for the past three years.

One of the most important developments that resulted from the program to put Stran-Steel back on the

(continued)

Fig. 1 — Stran-Steel Building erected for Price-Roche Motors in Petaluma, Calif., is an attractive structure of color-coated ribbed steel panels, used for both roof and siding.

list of big producers of steel buildings is the method now used for factory application of colored coatings. More than any other change made during this period, this has helped Stran-Steel to shake its "tin-shed" reputation. More than 8,000 colored buildings have been sold in 2½ years.

Designer Harley Earl researched customer preferences, recommended that Stran-Steel offer nine different colors: light blue, white, light green, mist green, deep blue, yellow, slate gray, light gray and orange.

Hillery Knecht, Stran-Steel manufacturing vice president, convinced management that color could be an important plus in marketing steel buildings. Management allocated enough money for building an experimental coating line which Knecht now describes as "A Rube Goldberg."

With its pilot line operating in 1958, Stran-Steel became the first producer to offer colored steel buildings. Dealers began to sell customers on the advantages of factory-applied coatings versus painting in the field:

- Paint applied outdoors always picks up dust and foreign matter while drying.
- On roofs, workers must walk on the first coat to apply the second.
- It's impossible to control quality consistently in the field—film thickness, for instance, is bound to vary.
- Coatings applied in the factory can be baked on—obviously impossible in the field.
- Costs about two cents per square foot more than plain galvanize, compared to 10-12 cents a square foot for painting siding in the field.

The response was nothing short of startling. Company officials thought Stran-Steel would sell a few buildings in color to begin with and that maybe their acceptance would grow

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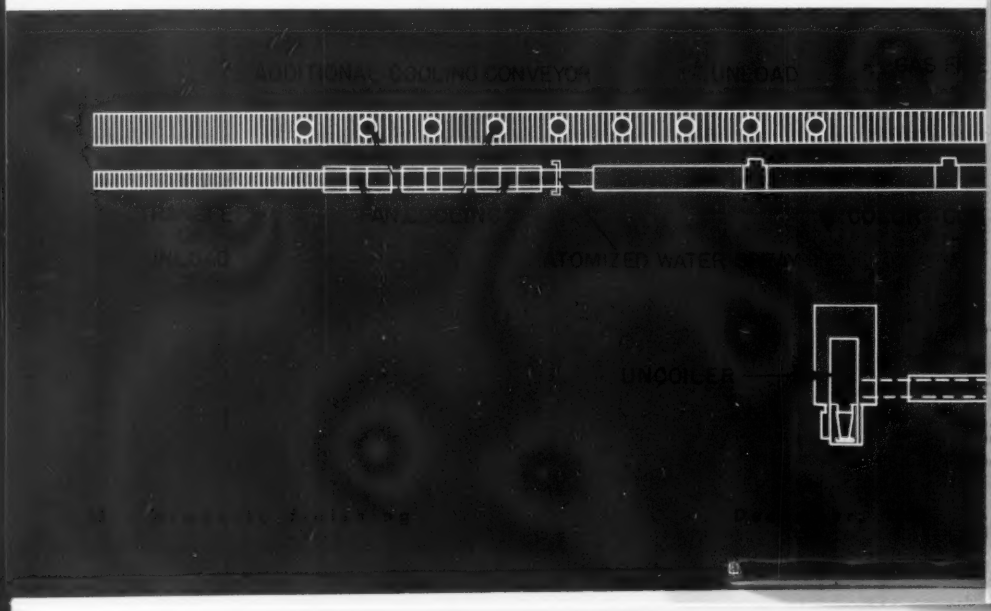
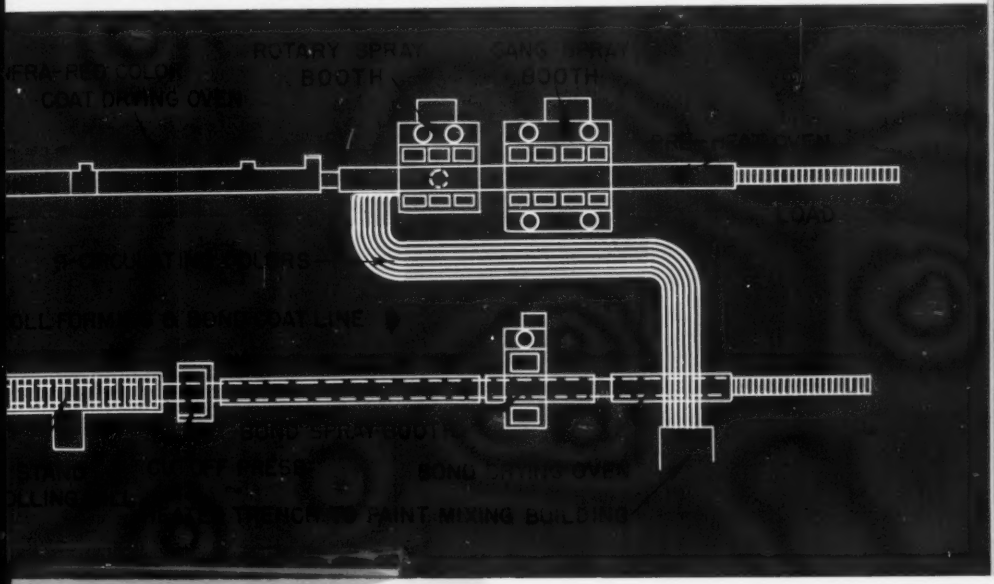
Layout of coating lines at Stran-Steel. Coil of galvanized steel feeds into the line from



"Costs about two cents per square foot more than plain galvanize . . ."

Fig. 2 — Simple Quonset Hut was familiar sight to GI's, retained popularity in civilian applications after the war. Sales slumped in mid-fifties, though, pushing Stran-Steel into new manufacturing techniques—particularly new design and finishing techniques.

uncoiler" on lower line. Colored panels come out of upper line at "unload" station.



"Getting volume from what was originally an experiment was difficult at best . . ."

in time. Instead, ninety per cent of the company's orders specified color within only a few months after color coating was announced.

The tremendous demand for color forced Stran-Steel to make its pilot coating facilities a production line. Getting volume from what was originally an experiment was difficult at best, however, and plans were set in motion to build a full-scale coating line to take care of the flood of orders —by now the highest peacetime sales in the company's history.

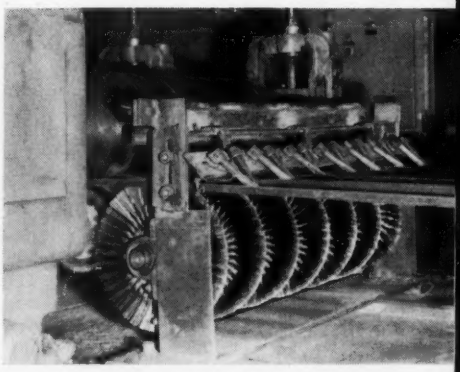


Fig. 3 — Galvanized steel uncoils into roll former which forms ribbed design characteristic of Stran-Steel siding and roofing.

Fig. 4—Wire brushes above and below formed galvanized strip brush off any small flakes of zinc coating loosened during forming.

The new line that emerged from the drawing boards is 600 feet long, will coat one million lineal feet per week. It's completely conveyorized, makes use of automatic equipment wherever possible. A central paint supply pumps paint to the various spray booths and dip tanks in the plant. Baking temperatures and preheating are carefully controlled, since this is an important part of the process for producing an adherent color coating.

The coating line recently began full-scale operation at Stran-Steel's one million square foot Terre Haute plant. It applies colored coatings to ribbed galvanized sheets. In most cases the colored coatings are applied on only one side of the panels—the outside. But the company is applying color to both sides where this is desired by its customers.

Stran-Steel begins with coils of clean galvanized steel. The galvanize conforms to A. S. T. M. Specification A-93, with a nominal coating weight of 1.25 oz. of zinc per square foot. The operations required to convert galvanized coils into the colorful ribbed panels used for the siding and roofing on Stran-Steel buildings include roll forming; spray priming with a special reactive bonding material; baking; application of a colored vinyl coating (again by spray); baking, cooling; and unloading the finished sheets. Various types of conveyors carry the sheets through these operations, and automatic spray guns apply the bond coat as well as colored finish coats.

The long rolls of galvanized sheets are 41½ inches wide, come into the plant tightly coiled and wrapped to prevent contamination by dust and dirt. Since the zinc-coated metal is clean when it leaves the galvanize line, no further cleaning is necessary.

Roll Forming

The forming and priming line is approximately 240 feet long. A ten-ton Yoder uncoiler feeds the galva-

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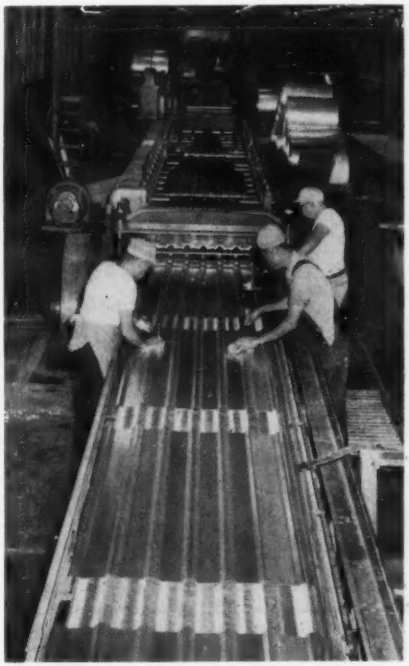

Fig. 5 — Formed panels, cut to length by cut-off machine just behind the men, move down the conveyor belt toward the spray booth (to rear of photographer). The galvanized strip (41½ inches wide) feeds into the roll former at a speed of 95 f.p.m. Formed into ribbed design, it is 38 inches wide. Belt conveyor in foreground takes formed panels away from cut-off at 105 f.p.m. The small arm riding on the sheet between the two men at right is a sensing device which actuates spray guns just as panel arrives beneath the guns, closes valves as the trailing edge leaves. It is called a "memory" timer.

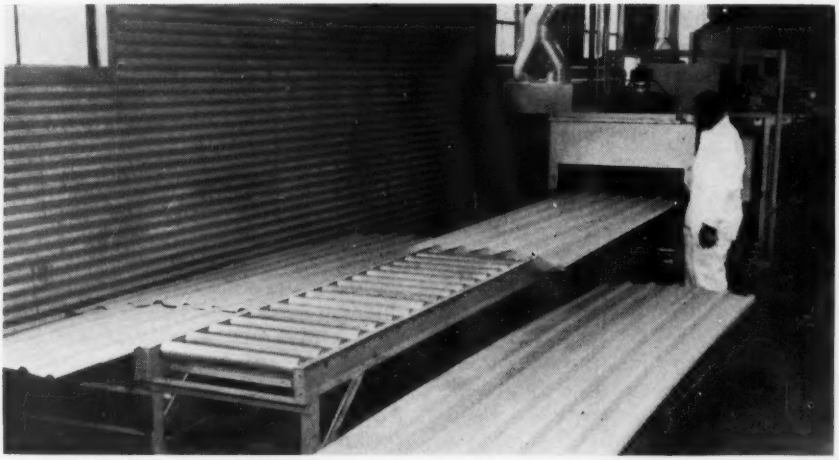

Fig. 6 — Panels leave the oven that bakes the bond coat, are transferred to truck which carries them to color-coat line. Water wash spray booth where bond coat is applied is in right background. The special bond coat is tinted yellow to facilitate inspection.

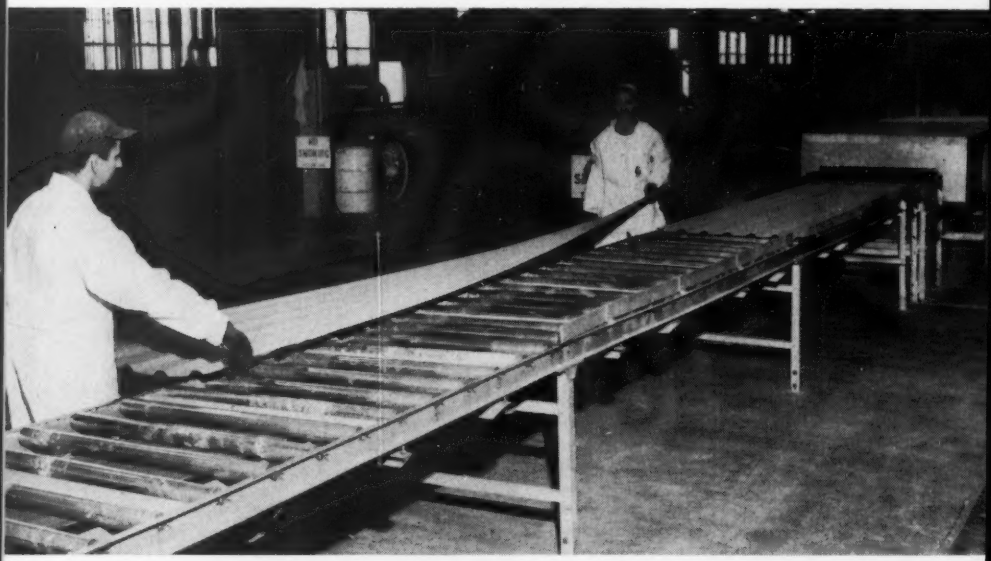

Fig. 7 — Primed panels are transferred to roller conveyor which takes them into preheat oven in right background. Proper temperature is important. If panels are sprayed with color coat while they are too hot, blistering occurs. If the panels are too cold when the color coat is sprayed on, the coating does not set properly.

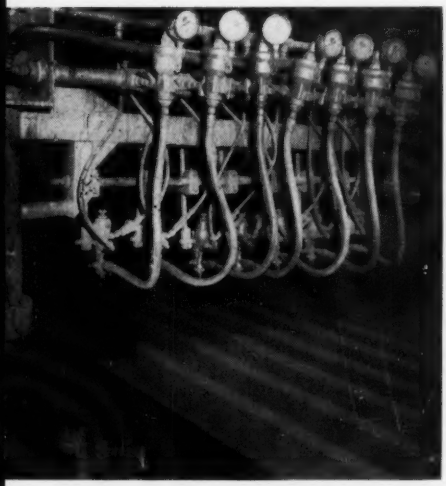

Fig. 8 — Seven automatically actuated spray guns apply first color coat as sheets travel through the spray booth on a conveyor.

nized sheet into the roll former (Fig. 3) which rolls the wide "ribs" into the galvanized coil. This is a progressive-stage machine. It feeds into the cut-off machine.

Should some of the galvanized zinc coating loosen during the roll-forming operation, wire brushes above and below the sheets (Fig. 4) coming out of the roll former remove any loose flaking before the panels go to the coating operations.

A rubber belt conveyor picks up the sheets as they come out of the shear (Fig. 5). It moves slightly faster than the sheets are moving as they go through the roll former, so that the ribbed sheets are spaced out on the belt rather than being jammed together, end to end.

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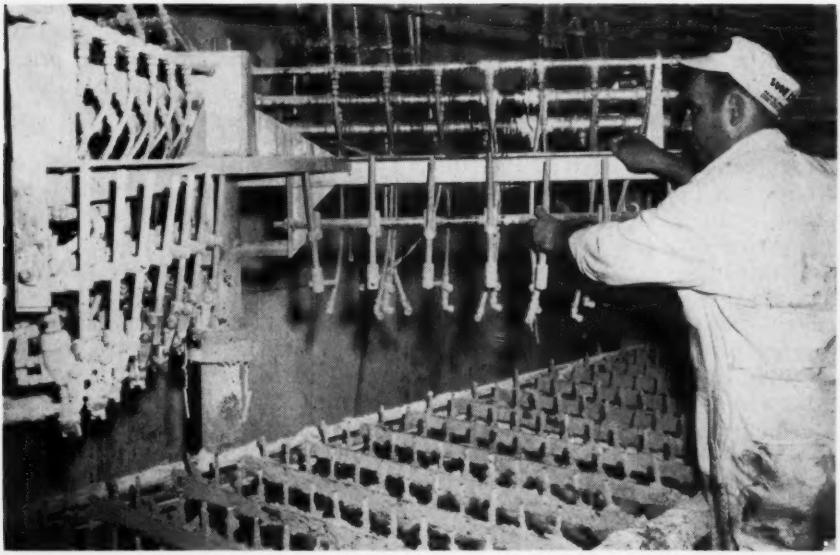


Fig. 9—Worker demonstrates how two identical sets of spray guns on swinging arms facilitate three-minute color change. Guns are not in place on the arm he is holding. Note pin-type conveyor. This type of belt is used because it's easy to keep tops of the pins clean, which helps to prevent dirtying the reverse sides of the sheets being painted.

"Without the special primer, subsequent paint coatings would quickly peel . . ."

Bond Coat

The belt conveyor takes the corruguated sheets to a pin-type conveyor which carries them through the first coating operation—spraying of the bond coat.

This reactive primer simultaneously phosphatizes the galvanized coating and deposits a corrosion-inhibitive film. Basically this important adhesion promoter is a high-molecular-weight vinyl acetal resin that's combined with active compounds such as phosphoric acid, chromates and alcohols. It reacts chemically with the zinc coating so that excellent adhesion is ensured. Without the special primer, subsequent paint coatings would quickly peel, since conventional paints do not adhere to galvanize.

Five spray guns inside the water wash spray booth are actuated by a memory timer so that they begin spraying the bond coat just as the leading edge of the sheet is directly beneath the guns. The coating applied must yield a dry film thickness of approximately 0.3 mil.

A pin-type conveyor is used in this and other painting booths because it's easy to clean off the tops of the pins. Since the sheets touch only the tops, overspray on the rest of the conveyor does not get on the sheets. Spare pin-type conveyor belts are exchanged for the belts in service when overspray builds up. Thus the dirty belt can be cleaned without delaying production.

Overspray from this spray booth is sucked through a steel grating in the floor and collected in a water wash curtain. Coagulants are used in the water curtain to facilitate removal of paint solids.

Leaving the paint booth, the sheets travel through a "blow-back" tunnel where a fan blows evaporating solvents back into the booth. Then the sheets go into a 20-foot-long-dry-off oven which bakes the primer at 275 deg. F. This oven is heated by a 600,000-B.t.u. gas burner. Air circulation is by convection.

The sheets pass beneath a large fan as they emerge from the oven (Fig. 6). The fan helps to cool the sheets prior to handling and stacking. The primed sheets are then stacked on an industrial truck that's used to transport them to the beginning of the color-coating line. This line parallels the forming and prime line, but runs in the opposite direction.

Color Coating

The color-coating line is approximately 360 feet long. Sheets begin their trip through this line (Fig. 7) by entering a 20-foot infrared oven which heats the sheets to 100-125 deg. F. before application of the color coat. Temperature control is important. If the sheet is too hot, the coating blisters. If too cool, it will not "set" properly.

Another pin-type conveyor picks up the sheets after the preheat and takes them into a double water-wash gang spray booth. The seven automatically triggered guns (Fig. 8) which spray a vinyl color coating are mounted on an arm which swings out over the conveyor. To speed color changes, two identical sets of spray

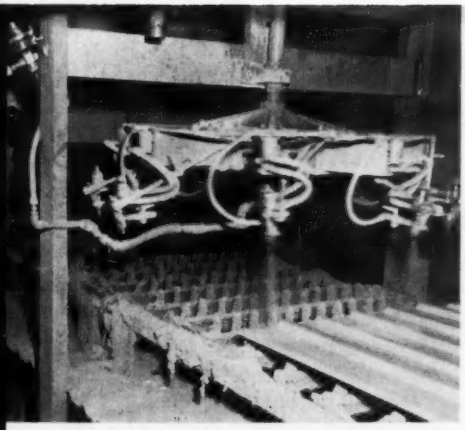


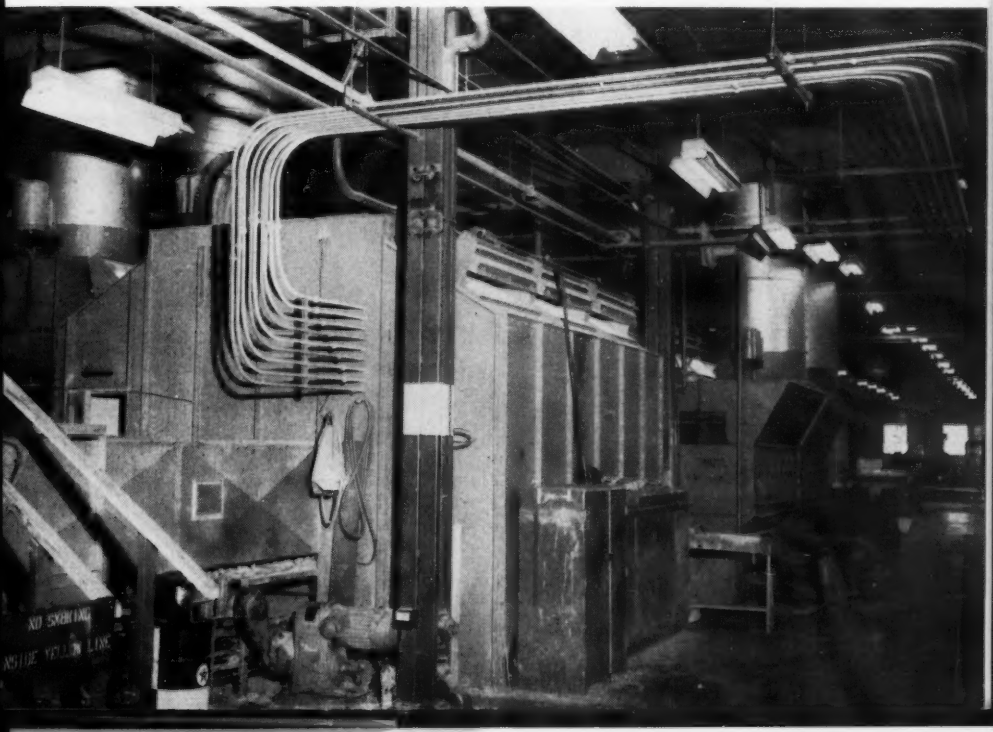
Fig. 10 — Carousel-mounted spray guns whirl at 40 r.p.m. as sheets travel beneath. This increases film thickness on flanges and vertical surfaces not covered well by stationary spray guns in first color coat booth. Sheets are wet as they enter this booth.

guns are mounted on these swinging arms (Fig. 9). When a different color is required, the battery of spray guns that had been applying the paint is swung out of position and the identical set of spray guns with the new color moves into spray position in less than three minutes.

From the gang booth the wet panels immediately move into another water wash spray booth. This booth houses a battery of spray guns mounted on a "carousel" (Fig. 10), which rotates as the guns spray. Purpose of the rotary-spray setup is to beef up the film thickness on the flanges of the panel. With the stationary spray guns only, Stran-Steel engineers found that film thickness

(continued)

Fig. 11—Exit end of water wash spray booth. Tunnel oven that bakes color coat is in foreground. Note nine pipes that supply paint from central system. Each of the paint-supply pipes is painted in color that corresponds to color of the paint being carried.



"The baking oven has four different temperature zones."

could be brought up to specifications on the horizontal surfaces, but sides of flanges were often below par. The carousel revolves the guns at 40 r.p.m., applying the paint on the sides of flanges (as well as flat surfaces) so that film thickness will be adequate on flange sides too.

Coating thickness is checked to be sure that it is at least 1.25 mils total (primer and finish coats) after drying.

Color coating material is based on vinyl chloride-acetate copolymer resins. Colors applied include light blue, white, light green, mist green, deep blue, yellow, slate gray, light gray and orange. All have metallic pigmentation except white, yellow and orange. Roof panels are always painted with the non-metallics.

Baking

Leaving the carousel booth (Fig. 11), the panels travel through a "blow-back" tunnel, then enter a long (245 feet) tunnel oven (Fig. 12). A conveyor with horizontal flight bars takes the panels through the oven. The baking oven has four different temperature zones. In the first zone, the temperature is approximately 275 deg. F. Most of the solvent in the coating "flashes off" here. A combination of gas burners and infrared tubes heats this zone. It has a 600,000-B.t.u. gas burner and three banks of 2000-watt infrared tubes (36 kilowatts for each bank). Air circulates at the rate of 3500 c.f.m.

Zones two, three and four are each heated by a 300,000-B.t.u. gas burner and two banks of infrared tubes

Fig. 12—Long tunnel oven has four stages to bake color coat. Control panel is at left. Auxiliary line at right is used when the ribbed panels must be coated on both sides.

(12 kilowatts each). Temperatures are as follows: zone two, 175 deg. F.; zone three, 250 deg. F.; zone four, 300 deg. F.

Temperature of the sheets coming out of this oven (Fig. 13) is approximately 200 deg. F. To cool the sheets before unloading and packaging, four spray guns lightly mist coat the sheets with water, which immediately vaporizes; then the panels travel beneath six 12,000-c.f.m., low-r.p.m. fans. The panels are unloaded at a temperature of 120 deg. F.

Why Galvanized Sheets?

Stran-Steel faces the realities of the construction business in its use of galvanized sheets for its prefabricated building panels. Since the line at Terre Haute applies a primer and finish coat, you might ask "why not color-coat plain cold-rolled steel?" One reason, of course, is that the zinc beneath the organic coating provides additional corrosion protection. Another is that the reverse side, which will be on the inside of the building, must be protected. But the compelling reason for using the galvanized sheets is that the organic coating will almost certainly be scratched during erection. Even careful workers will put an occasional scrape into the beautiful color coating. Without the heavy zinc coating as a base, ugly rust would soon mar the appearance.

Use Precoated Stock?

The use of galvanized sheet has also helped to dictate the practice of forming the sheets before finishing rather than the reverse. Many manufacturers of painted products paint the flat sheets, then form the products, knowing that organic finishes can take such treatment. But at Stran-Steel this is not practical.

The pile of small zinc flakes beneath the brushes at the end of the

(continued)

Fig. 13—Workers unload finished panel from end of color-coat line. Series of fans at left quickly cools coated sheets so that they can be handled and stacked without "blocking."

"Stran-Steel puts its color-coated panels through a series of rigorous tests . . ."

roll forming machine shows why. Should the galvanized sheets be painted and then roll formed, these loose zinc particles would be beneath the color coat. This would eventually result in failure of the coating because of small zinc flakes chipping off beneath the color coat.

Use of precoated sheets would also cause inventory problems. To get the economic value of continuous forming, ten-ton coils of precoated metal would probably be necessary. This entire coil would have to be fed through the roll former to avoid the expense of changing the coil in "mid stream" and stringing a new coil in its place. As a result, the plant would have no choice but to run a large number of panels in one color before changing to a coil of another color. The panels from such a run that were not used to make up an order would have to be stored. This would increase the inventory of finished panels, and considering the fact that various lengths are offered, the inventory problem would become almost insurmountable.

By coating after forming, any number of panels in any length can be run on order without building up an inventory.

Only standard lengths in popular colors are stocked now. Green, white and blue are the colors that are most in demand and these are kept in stock to meet quick-delivery requirements. About 30 per cent of the production is in green, 40 per cent in white, 15 per cent in blue, with the other colors making up the balance.

Lengths

The color-coating line can run a sheet 100 feet long if necessary. In practice, however, 35 feet has been the longest, and usually 25 feet is the maximum because of difficulty in handling longer lengths during erection — wind, weight, and so on. The minimum length on a production basis is four feet.

Test Procedures

Stran-Steel puts its color-coated panels through a series of rigorous tests to be sure they'll have the quality that the new production facilities are designed to produce. Here are the specifications:

Coating Thickness. Dry coating film thickness including pretreatment and finish coats is 1.25 to 1.5 mils, with a minimum thickness at any spot of 1.25 mils.

Adhesion. Coated panels are tested by making two parallel cuts, ¼ inch apart, through the paint, and an intersecting right angle cut. Adhesion is tested by cutting the paint film loose from the substrate and attempting to peel the coating back from the intersecting cut. If any coating can be peeled back, adhesion is unsatisfactory. If none can be peeled back or insufficient coating can be cut away in a piece large enough to hold, the adhesion is excellent. In this test, a good coating system should pull apart before it can be peeled from the surface.

Color and Appearance. Color is matched to approved color standards. The color match is evaluated by both a color-difference meter and

by observation by a group of qualified color matchers. The results from the color-difference meter and visual observation are compared. In cases where there is a disagreement, the opinion of the visual color matchers prevails. Appearance of the surface must not show mottling, wrinkling, orange peel, runs, sags, dry spray and craters.

Gloss. For the non-metallic coatings the average specular gloss rating must be 15 to 20 when determined as outlined in Federal Test Method Standard 141, Method 6101. The metallic coatings are matte finish (no gloss requirement).

Blocking. Bundles of coated sheets must not exhibit detrimental "blocking" at any time prior to installation on the buildings up to six months from time of coating. Detrimental blocking is defined as any sticking together which is sufficient to pull paint off the substrate, off the pretreatment, or to pull the paint film apart.

Salt Spray. Coated panels are tested for resistance to salt spray in accordance with the American Society for Testing Materials Method B-117-57T. Panels are cut with a diagonal cut through the organic coating to expose the substrate but not through the zinc to the basis metal. After 500 hours exposure, the coating system must show excellent adhesion, with no more than $\frac{1}{8}$ inch loss of adhesion from zinc oxidation or blistering at the score mark.

Water Immersion. Coated panels are tested by immersion in water in accordance with the American Society for Testing Materials Method D870-54. There must be no blistering after immersion for two weeks. After a two-hour recovery period, the film

(continued)

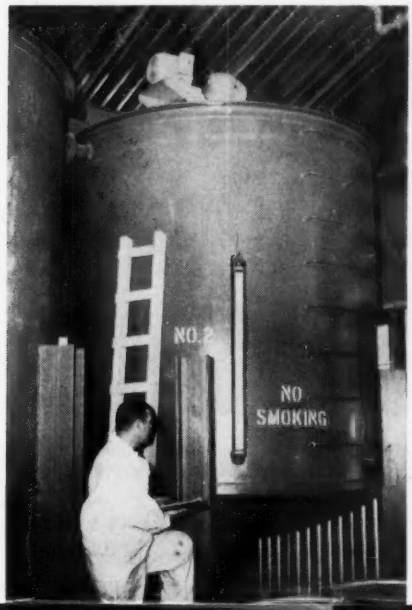


Fig. 14—These two 3500-gallon storage tanks hold red oxide primer, which comes to plant in tank cars. Thick, unreduced material is pumped into mixing tanks for thinning.

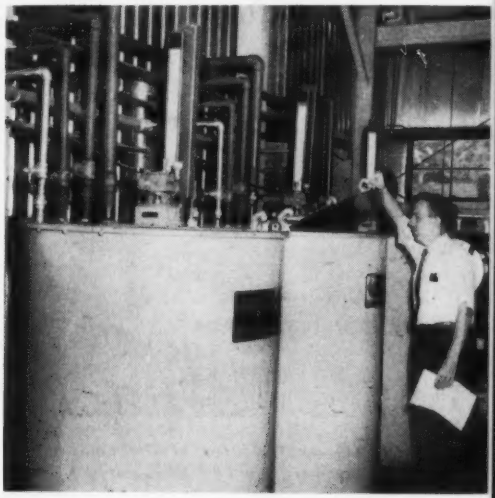


Fig. 15—A. G. McLean, plant layout engineer responsible for this system, looks inside 250-gallon mixing tank where red oxide primer is diluted with solvent to adjust viscosity.

must have adhesion equal to that before immersion, no softening, and no whitening of the surface.

Coated panels are subjected to exposure in an Atlas Weatherometer in accordance with A.S.T.M. Method E-42-57T. After 500 hours of exposure the coatings must show no checking or cracking. This shall be determined by polishing a one-inch strip with an automotive cleaning compound to remove all dirt and chalk. Mild chalking is permissable, but serious erosion constitutes failure. No rusting or appreciable color change is allowable.

Humidity. Coated panels are subjected to exposure in a humidity chamber in accordance with Federal Test Method Standard 141, Method 6201. Exposure is at a temperature of 105 - 110 deg. F. and at a relative humidity of 95 - 100 per cent for a period of 500 hours. After a two-hour recovery period, the film must show no blistering or loss of adhesion.

Flexibility. The complete coating system must show satisfactory adhesion and flexibility when tested on a 26-gage annealed galvanized sheet of the type ordinarily used and subjected to a 180 deg. bend test in accordance with the Federal Test Standard 141, Method 6222. There must be no loss of adhesion nor cracking of the coating when inspected with a magnifying glass.

Abrasion Resistance. The non-metal-

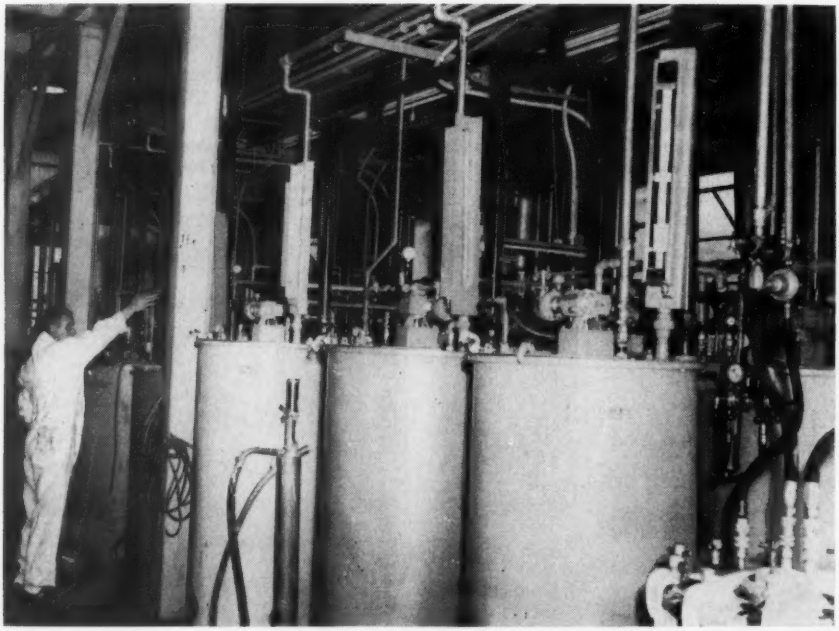


Fig. 16—In this area of the paint-mixing building there are two tanks for each color used in the plant. High-pressure pumps supply pressure for recirculation of coating material.

lic coating system as applied to 26-gage galvanized sheets must not show a wear index in excess of 100 when tested for abrasion in accordance with the Federal Test Standard 141, Method 6192, using CS-10 wheels. The metallic coating systems (having aluminum pigmentation) when applied and tested the same way must show a wear index in excess of 75. In both cases the wheel pressure against the test film is 1,000 grams and the number of wear cycles is 500.

Outdoor exposure. Coated panels are exposed to the natural outdoor atmosphere at locations which duplicate, insofar as possible, the atmospheric conditions for construction as typified by rural, surburban, heavy industrial and coastal areas. Before exposure, the panels are scored in an "x" fashion, the cut to be through the coating system but not through the zinc to the base metal. After exposure for a period of one year in a southerly direction and at an angle of 45 degrees there must be no corrosion of the substrate, no loss of adhesion or failure of the film except for minor color changes, and no loss of adhesion due to zinc oxidation or blistering extending from the cuts for more than one eighth inch.

Paint Storage and Distribution

All paint used in Stran-Steel's Terre Haute plant comes from a separate paint mixing and storage building. Materials circulate through 1¼ inch lines that run through the plant to the points where the paints are used and back to the storage building. Over 7,700 lineal feet of this line run through the plant to supply paint where it's needed.

Since red oxide primer is used in substantial quantities, Stran-Steel buys it in heavy, unreduced form, ships it into the plant in tank cars. It's stored in two 3,500-gallon storage tanks (Fig. 14) in the paint-storage building. The unreduced material is blended with solvent in three 250-gallon mixing tanks (Fig. 15) to obtain the proper viscosity. Solvents (Zolex thinner) are stored in a 12,000-gallon underground tank. After viscosity of the paint has been checked, air-driven pumps circulate the paint through the plant. Viscosity of the red primer is kept at 18 seconds on a Zahn No. 2 Cup.

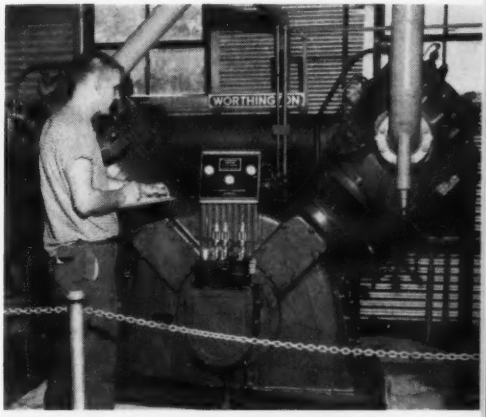


Fig. 17—Large V-type compressor produces compressed air for paint-distribution system.

The nine color coatings are brought to the paint mixing and storage building in 50-gallon drums. They are reduced with methyl isobutyl ketone thinners to the proper viscosity for spraying. The white coating is kept at 40 seconds on a Zahn No. 2 Cup and the colored materials at 20-24 seconds. Viscosity is varied by the foreman on the line.

All materials constantly recircu-

(continued)

"There are two mixing tanks for each color used."

late. High-pressure pumps keep the pressure in the lines at 80-100 p.s.i. The recirculation is stopped only if the plant is closed for more than three days. When this occurs, solvent is pumped into one of the mixing tanks (Fig. 16) and then through the lines to force the paint back into the other mixing tank (there are two mixing tanks for each color used). The paint is held in this tank until the plant goes back into operation, then its viscosity is rechecked and it's pumped back into the lines.

The new paint-mixing and storage building plus the added painting facilities in this plant required considerably more compressed air than the plant had available. This was remedied by installation of a 400-c.f.m. V-type, water cooled compressor (Fig. 17) with a heavy-flow after-cooler between the compressor and the receiving tank. Compressed air from this receiver supplies the needs of the paint-mixing and storage building, plus three spray booths. It runs almost at capacity.

Holes and Field Cuts

Stran-Steel does not pre-punch the panels. This is done by the erector in the field. To prevent corrosion at the holes. neoprene gaskets are used to seal out water. This has not been a problem and no corrosion has been evident on Stran-Steel buildings that

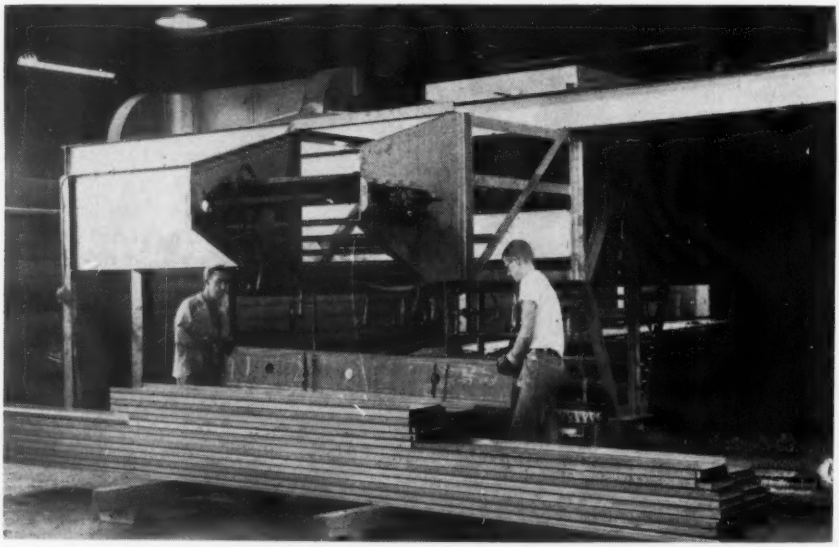


Fig. 18—Entrance end of dipping area where red iron oxide primer is applied on structurals. Bar-and-chain type conveyor carries the parts into dip tank and through drip area. (Photographs by PRODUCTS FINISHING and Stran-Steel Corporation, Detroit, Michigan.)

have weathered for a period of years.

Durability

Accelerated weathering tests have shown that the coating system on Stran-Steel panels will last between 10 and 15 years with only slight deterioration.

Painting Structurals

Stran-Steel also paints structural members with red oxide primer in the Terre Haute plant. Depending upon the size and shape of the parts being primed, the red oxide is applied by dipping (Fig. 18) or hand spray. Large columns and rafters are hand sprayed. Every steel part (except the panels) is coated with the red oxide primer.

★ ★ ★

Dye-Penetrant Flaw-Location Movie. A motion picture titled "How to Locate Flaws with Dye Penetrants" is available free from Turco Products, Inc. The film, which is intended primarily for training purposes, visually demonstrates every aspect of dye-penetrant inspections from laboratory theory to authentic production-line techniques actually filmed on location during mass-production dye-penetrant inspections.

On-the-spot sequences shown include the inspection of wing spars, small aircraft parts, truck wheels, valves, oil-tool components, gears, spindles and pressure-vessel weld seams.

The laboratory sequence describes the theory behind dye penetrants in detail and outlines the proper methods of assuring complete inspection accuracy. A laboratory inspection is performed on glass microslides which have been fastened together to simulate a defect. In this sequence the viewer can see exactly what action takes place when flaws are located in metal parts with dye penetrants.

A "Sneak Preview" folder describing the film in detail is available without charge or obligation from Turco Products, Inc., 24600 S. Main St., Wilmington, Calif.

★ ★ ★

Booklet on Selective Plating. An eight-page booklet lists varied engineering applications of a new, high-speed selective plating process. In addition to discussing problems solved by the new method, the brochure describes equipment, techniques, and results achieved. It also has a one-page question-and-answer section for a quick overall idea of process capabilities.

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SC Solvent #1	211	240	116	30	2.5	86.4	+ 1	.8259	6.88	74%
SC Solvent #1-A	202	235	113	25	2.5	67	+48	.8003	6.66	52%
SC Solvent #2	270	308	153	81	14.0	80	— 2	.8418	7.01	76%
SC Solvent #2-B	277	370	188	81	21.5	75	+12	.8388	6.99	68%
SC Solvent #3	356	400	204	135	64.0	72	+24	.872	7.26	69%
SC Solvent #28	329	379	193	122	51.0	73	+14	.8597	7.16	74%
SC Solvent #100	321	351	177	115	21.0	93.2	—37	.8708	7.25	96%
SC Solvent #150	369	412*	211*	152	98.0	91.8	—26	.8899	7.41	96%
SC Solvent #450	450	588*	309*	212	750	73	+10	.9279	7.73	

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Control of Chromium

Improved chromium plating possible through use of

By JOSEPH P. BRANCIAROLI
Technical Sales Representative
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Fig. 1—Ralph Festa, plating foreman at Advance Plating Co., Cleveland, determines the chromic acid content of a chromium plating bath by using a hydrometer.

The control of plating baths by analysis has brought about a considerable amount of the progress made in finishing practices since 1925. Today the advanced technology of the various plating processes indicates that plating is becoming a science and careful analytical control should be routine.

The outstanding advantage to be gained by analysis and control of plating solutions is assurance of consistent, predictable results. Basically, this is what an operator desires from a plating bath. The important reason for analyzing a plating bath is not to determine its exact composition, but to determine whether the composition is within certain limits. Usually these limits are not narrow. Generally an operator can produce good plating even though the bath composition varies somewhat.

This business of tolerating a certain amount of variation in formulation is true of chromium plating baths. But control is needed.

Because a chromium plating solution contains only a few components, many operators feel that nothing serious can happen if the bath is permitted to fluctuate widely in composition. Many chromium plating baths are producing poor results because there is a disregard for solution control. Sometimes these baths are checked only when troubles

Plating Baths

simplified analytical control methods . . .

Fig. 2—Another way to determine chromic acid content of plating bath is by titration.

develop. Actually it is much more desirable to have a chromium bath perform properly at all times. It takes only a few minutes a week for proper solution control.

The first necessity in organizing a good control program is to keep accurate records. Such records should show how a particular chromium bath changes in composition during its use. The change in composition is dependent upon the number of ampere-hours of current passed through the bath, the amount of solution dragged out and the spray losses. Evaporation losses will usually cause the composition to change by 2 to 5 per cent during a day's operation.

In some cases, the losses of various components of the bath are proportional to the loss in chromic acid content; thus determination of chromic acid indicates to the operator the approximate amount of other components which are needed. This simple method often can help the operator maintain the bath composition close to the recommended formulation. A complete solution analysis should be made at periodic intervals, however, so that the bath can be brought into exact balance.

The chromic acid determination can be as simple as putting a hydrometer in the solution. Hydrometers which are calibrated in ounces per

Table I—Direct Conversion of Degrees Baumé to oz./gal. of Chromic Acid

Degrees Baumé	oz./gal. CrO_3	Degrees Baumé	oz./gal. CrO_3
10.5	15.0	21.5	33.3
11.0	15.8	22.0	34.2
11.5	16.5	22.5	35.1
12.0	17.3	23.0	36.0
12.5	18.2	23.5	37.1
13.0	19.1	24.0	38.2
13.5	19.8	24.5	39.1
14.0	20.4	25.0	40.0
14.5	21.2	25.5	40.9
15.0	22.0	26.0	41.9
15.5	22.9	26.5	42.9
16.0	23.7	27.0	44.0
16.5	24.5	27.5	45.0
17.0	25.4	28.0	46.0
17.5	26.3	28.5	47.1
18.0	27.2	29.0	48.2
18.5	28.1	29.5	49.2
19.0	29.0	30.0	50.2
19.5	29.8	30.5	51.5
20.0	30.6	31.0	54.0
20.5	31.5	31.5	54.0
21.0	32.4	32.0	55.2

gallon of chromic acid are available. Baume hydrometers can be used in samples cooled to the calibration temperature marked on the hydrometer. The reading can be converted to ounces per gallon of chromic acid by using Table I.

It must be kept in mind that impurities will cause the Baume reading to be higher than is warranted by the actual chromic acid content. Periodically, the chromic acid content should be determined by chemical analysis and a notation made of the difference between chemical analysis and hydrometer reading. Hydrometer readings should then be corrected by that amount.

When a hydrometer reading shows 4 to 5 oz./gal. more chromic acid than is indicated by analysis, it is time to purify the solution. This can be done by discarding a portion of the bath and adding new chromium bath to replace it.

In analyzing for chromic acid as well as other constituents, precise manipulations should be eliminated if a high degree of accuracy is not warranted. For example, the chromic acid content of a bath generally changes rapidly. It is meaningless to determine the chromic acid content with great precision if the actual value in the tank has changed considerably by the time the analysis is completed. The general lack of accuracy with which replenishment additions are measured would also indicate that precise analytical determinations are wasteful of the analyst's time.

Analytical procedures should be made as short as is practical. Elimination of aliquot samples by using a concentrated sample instead will save one pipette measurement and a dilution to volume. For example, instead of taking a 10 ml. sample, diluting it to 250 ml. in a volumetric flask and then taking a 10 ml. aliquot, a reasonably accurate determination can be made by taking a 0.4 ml. sample with a 1 ml. pipette graduated in 0.01 ml.

There are various procedures for the determination of chromic acid

content.[1,2] The following procedure is easy to follow and quite rapid.

Determination of Chromic Acid

REAGENTS:

Acid mixture . . . One part sulfuric acid, one part phosphoric acid and one part water.

Ferrous ammonium sulfate (abbreviated FAS) 0.1N . . . Make solution of 40 gm./l. FAS. $6H_2O$ and add 25 ml./l. concentrated sulfuric acid.

Indicator — Ortho-phenanthroline ferrous sulfate complex indicator.

Potassium bichromate, 0.1N—Dissolve 4.904 gm. of C. P. grade $K_2Cr_2O_7$ and dilute to a liter.

STANDARDIZATION OF FAS: (Should be done periodically)

1. Pipette 25 ml. of potassium bichromate standard into 250 ml. Erlenmeyer flask and dilute to 85 ml.
2. Add 15 ml. of acid mixture and 3 drops of indicator.
3. Titrate to clear orange endpoint with FAS.

$$\text{Normality of FAS} = \frac{2.5}{\text{ml. FAS}}$$

PROCEDURE:

1. Pipette 0.4 ml. of chromium bath sample into a 250 ml. Erlenmeyer flask, using a 1 ml. pipette graduated in 0.01 ml.
2. Add 50 ml. of water, 15 ml. of acid mixture and 3 drops of indicator.
3. Titrate with FAS to clear orange endpoint.

EQUATION: oz./gal. chromic acid = (ml. FAS) (N of FAS) (11.12)

Sulfate Determination

The amount of sulfate in a chromium bath can be determined accurately by a gravimetric method or with reasonable accuracy using the much faster centrifuge method. Unless there is some reason for great precision, the centrifuge method is entirely satisfactory.

Fig. 3—Reading the sulfate content of a chromium bath in a centrifuge tube.

Most graduated centrifuge tubes can be calibrated for sulfate; however, this involves considerable time and usually is not practical. For those who do not desire to go into the lengthy procedure and expense of calibrating their own tubes, there is available a commercial sulfate test kit which is quite satisfactory.

With the centrifuge method the amount of insoluble material in the sample must be determined before the sulfate is precipitated. This can be done by running a blank sample or centrifuging the sample before precipitating the sulfate.

Since sulfate determinations are made in duplicate, it is wise to determine how closely the two tubes match in calibration. This can be done by pouring a small amount of mercury from the first tube into the other and seeing how the calibrations agree.

Fig. 4 — Unracking chromium plated parts.

These tubes should be marked to be used together and a notation made if necessary as to the amount of correction needed in the reading.

Fluoride Determination

With the recent increasing popularity of chromium baths containing fluoride catalysts, a new analytical procedure for the determination of fluoride was introduced several years ago.[3] Just as it is necessary to know the quantity of chromic acid and sulfate in a chromium plating bath, the amount of active fluoride-bearing catalyst in the solution also must be known. Successful operation of these baths is possible only when all three components are present in the proper quantities.

The procedure for the determination of fluoride was recently modified and made much faster by Kocour Company, Chicago, Illinois. This particular procedure is for CPA 1800*; however, the same procedure can be used for other chromium baths with catalysts containing fluorides or fluosilicates, merely by changing the calculations.

Determination of CPA 1800*

REAGENTS:

Silver Nitrate, 1.57N . . .266 g./l.

Sodium Hydroxide, 2.75N . . . 110 g./l.

Buffer Solution: (Make up enough for one month and store in polyethylene bottle.)
Monochloracetic Acid . . . 37.8 g./l.
Sodium Hydroxide . . . 8.0 g./l.

Nitric Acid, 1:50—1 cc. nitric acid in 49 cc. distilled water.

Control Sample: (Equivalent to 1.2 oz./gal. CPA 1800*)
Chromic Acid . . . 33.0 oz./gal.
Sodium Fluoride . . . 5.00 g./l.
Thorium Nitrate, 0.0251N . . . 3.47 g./l.

Indicator—Sodium Alizarin Sulfonate, 0.1 per cent in water.

PROCEDURE: (Chromic acid content of bath must be determined first.)

1. Pipette a 5-ml. sample into a 100-ml. graduate.
2. Multiply the ounces per gallon of chromic acid by 0.3. Pour that number of ml. of sodium hydroxide into the graduate and mix.
3. Add twice as much silver nitrate as sodium hydroxide used and mix. Dilute to 100-ml. with distilled water.
4. Filter off 50 ml. into a dry 50 ml. graduate, using dry No. 4 or 40 Whatman filter paper.
5. Transfer the 50 ml. of filtrate into a 250-ml. Erlenmeyer flask, rinse the graduate with 5 ml. of distilled water and add to the flask.
6. Add 10 drops of Alizarin indi-

*Registered Trade Mark of Diamond Alkali Company.

Table II—Chromium Plating Difficulties: How To Remedy

Plating Results	Causes	Corrective Steps
Poor coverage.	Low chromic acid content.	Raise the ratio by adding chromic acid.
	Excessive quantities of catalysts.	Remove some sulfate with barium carbonate or add chromic acid to raise the ratio.
	Low catalyst content.	Lack of coverage here is caused by the bath's inability to activate passive surfaces. Add catalyst.
Gray deposit at high-current-density area.	Sulfate too low.	Raise sulfate content.
Dull or hazy decorative deposit at high current density.	Low catalyst content.	Raise catalyst content.
	Too high a ratio of chromic acid to catalyst.	Remove some bath, dilute the remainder and adjust catalyst.
Nodular hard chromium deposit.	Exceedingly low sulfate content.	Raise sulfate content.
Burned deposits.	Ratio too high for particular current density-temperature relationship.	Add catalyst. Utilize lower current density or higher temperature.
Poor plating speed.	Very high chromic acid content.	Discard a portion of bath, dilute and adjust the remainder.
	Ratio too high.	Lower ratio by adding catalysts.

cator, which should turn the filtrate pink. If a yellow color appears, insufficient sodium hydroxide was used initially and the test must be repeated.

7. Add nitric acid dropwise until the pink color of the filtrate turns to yellow.
8. Add 3 ml. of the buffer solution.
9. Titrate with thorium nitrate to a pink end point. Divide the burette reading by 10, which will give the CPA 1800* content in ounces per gallon.

Analytical results will be of little value unless the sample taken from

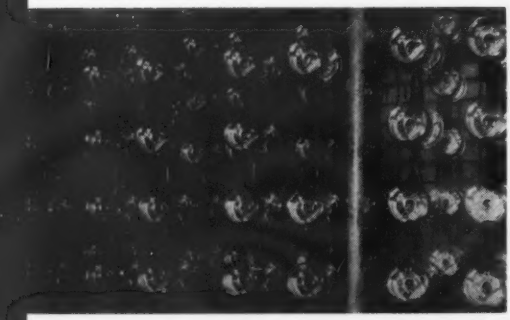


Fig. 5—Conveyor transfers chromium plated parts to rinse tank. (Photographs courtesy The Diamond Alkali Company, Cleveland, Ohio.)

the bath is representative of the entire volume in the tank. All too frequently a sample is taken from a bath after water has been added but not mixed in; or it comes from a bath that has stratified after a long idle period. It is always best to thoroughly agitate the bath before the sample is taken. If a sample is being taken after chemicals have been added, sufficient time should be allowed to permit complete reaction and uniform dispersion throughout the tank. For example, barium carbonate which has been added to reduce the sulfate content might require several hours to react, especially if it is lumpy when added or if stirring is omitted.

REFERENCES

1. Gray, A., Modern Electroplating, 1953, p. 150.
2. Langford, K. E., Analysis of Electroplating and Related Solutions, 1953, p. 28.
3. Branciaroli, J. P., "Determination of Fluoride in Chromium Plating Solutions," Analytical Chemistry, Vol. 28, May 1956, p. 803.

Some general difficulties which can be encountered when a chromium bath is out of balance in its principal components are shown in Table II. (The term "catalysts" used in this table refers to sulfate alone or in combination with fluoride-bearing compounds. The term "ratio" means ratio of chromic acid to total catalyst content.)

Throughout this article the emphasis has been on developing simplicity and speed in analytical control so that more of it will be done. For the organizations which do not have an analyst, but depend upon the operator to do whatever analytical work is required, these considerations are important. For this type organization, various commercial test kits are invaluable.

Accurately standardized solutions can be obtained as required. The use of these standard solutions in the various analytical procedures is relatively simple. There will be little excuse for not using the various test kits in control work if they are kept out on a clean bench, preferably near a sink.

★ ★ ★

Infrared Oven Speeds Finishing of Kitchen Cabinet Doors

A six-hour drying period has been cut to minutes by infrared ovens recently installed at the Louisville, Kentucky, plant of Gateway Manufacturing Company. Ceramic infrared ovens now dry base coats and lacquer top coats as doors for kitchen cabinets travel through on a conveyor.

The ovens, which were installed

"Conveyor speed can be increased and temperature raised simultaneously to speed drying."

by Dry Clime Lamp Corporation, Greensburg, Indiana, are part of a finishing line which is set up so that a door travels around a closed circuit and one side is finished in each cycle.

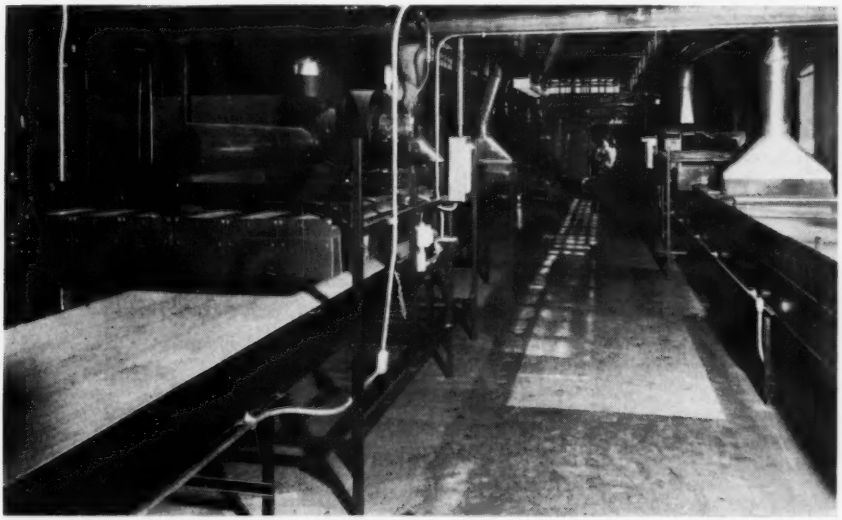
The door is placed on the conveyor with the inside face up. Two roller coaters apply the base coat, then the door enters a tunnel where warm air from the first infrared oven blows back over the surface to preheat the door. Inside the 10-foot-long infrared oven the base coat dries in 1¼ minutes—a process that requires at least one-half hour without heat.

After the finish is sanded and the edges of the door are spray coated, the door goes through another preheat area. It is then dried for approximately 1¾ minutes in a 17½-foot-long driQuik infra-red oven, which has two different temperature zones.

When the door reaches the end of the circuit, it is turned over, shifted to the right side of the conveyor, and again passes through the roller coater, the pre-heat tunnel and the first driQuik infra-red oven. After being sanded, it passes through a curtain coater which applies a lacquer top coat to the outside of the door.

A second preheat tunnel and another infrared oven dry this finish in minutes. Air drying would take at least six hours.

A great deal of space would be required for air drying, too, since the plant now turns out 700 or 800 doors a day. Using the ovens, conveyor speed can be increased and temperatures raised simultaneously to speed drying.



The finishing line at Gateway Manufacturing Company, Louisville, Kentucky, now has infrared ovens for drying coatings. (Photo courtesy Dry Clime Lamp Corporation, Greensburg, Indiana.)

Douglas Aircraft Installs Large Hard-Coat Anodizing System

One of the largest hard-coat anodizing installations in the country recently has been installed at an Army-owned, Douglas-operated Charlotte, North Carolina plant. Occupying 77 acres, this plant is devoted primarily to the manufacture of the Nike Hercules missile, the Army's ground-air antiaircraft weapon.

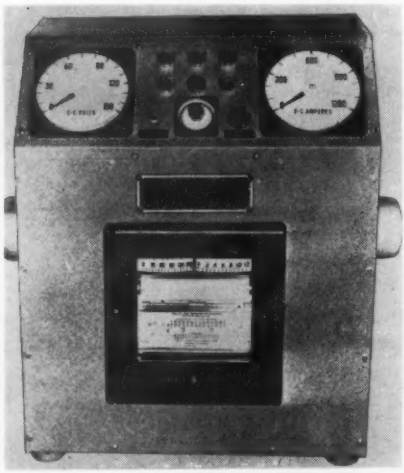


Fig. 1 — Control console of Hanson-Van Winkle-Munning rectifier. The console automatically changes current and voltage as work requirements demand. Several automatic alarm and warning devices are included.

Typical of the work which Douglas anodizes in this installation is a hydraulic cylinder for the Nike Hercules. Because the missile may be stored for many years before use, and because its components must be periodically tested during storage, the interior of the cylinder must have a hard wear surface and also resist corrosion and cracking. Hard-coat anodizing meets these specifications.

Essentially, hard coat anodizing is a process for creating a relatively thick network of interlocked aluminum oxide crystals on the surface of aluminum. The hard coat of aluminum oxide is produced by processing the parts at high current, and relatively low and varying voltage. Processing takes place at low temperature in a current-conducting solution.

Processing takes place in five process and rinse tanks installed by Hanson-Van Winkle-Munning Co., Matawan, N. J.

During the process of hard anodizing, the resistance of the aluminum increases as the thickness of the aluminum oxide coating increases. To

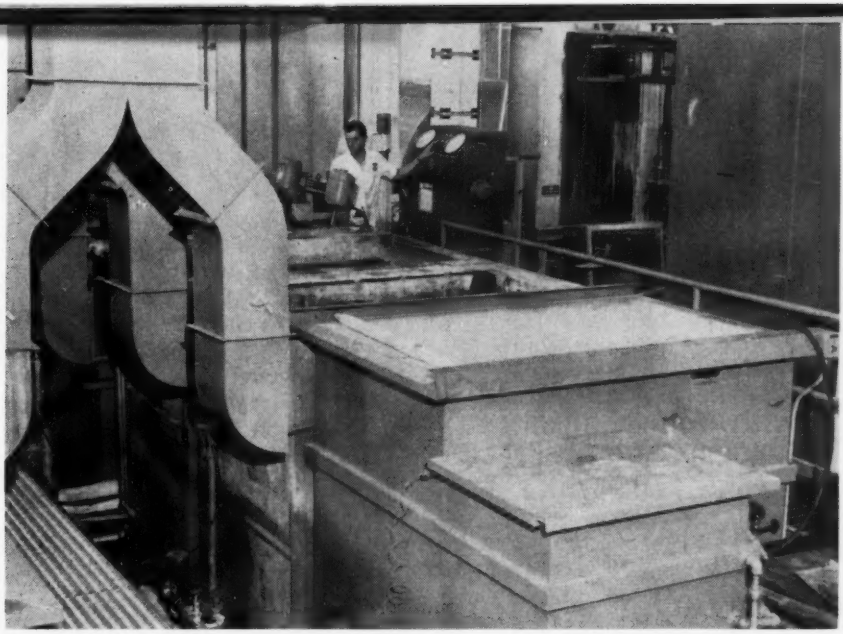


Fig. 2—Beginning of the hard-coat anodizing line, showing technician making a manual adjustment after lowering work into chilled anodizing tank filled with sulfuric acid.

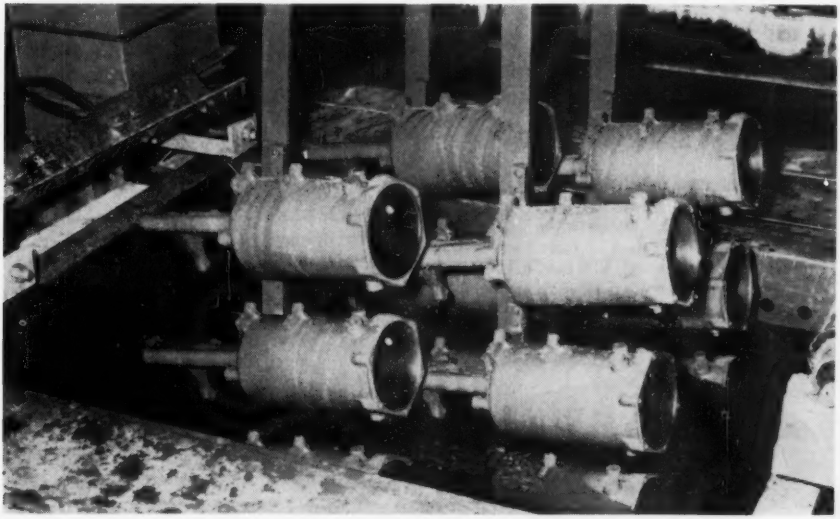


Fig. 3—Close up of work being withdrawn from tank after anodizing. Dark exterior of work is a plastic coating which prevents work exterior from being anodized. Solution temperature is about 20 deg. F., much colder than temperature of normal decorative anodizing bath. (Photographs courtesy Hanson-Van Winkle-Munning Co., Matawan, New Jersey.)

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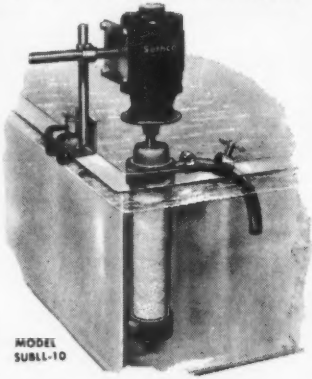

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keep the amount of current on the work surface constant, which is essential in the hard anodizing process, it is necessary to supply increasing voltage to the work.

A constant-current, constant-voltage 100-volt, 1000-ampere H-VW-M rectifier does this automatically. During processing the rectifier requires no supervision whatsoever.

The Douglas anodizing cycle takes approximately 75 minutes. It is necessary to provide a constant current of 25 a.s.f. At the beginning of this cycle, 10 to 20 volts are required to maintain this amperage. At the end of the cycle, 85-90 volts are necessary to maintain 25 a.s.f.

The rectifier control panel includes a recording ammeter and voltmeter to help Douglas record changes in the process and thus maintain control and surface uniformity. Several safety features were included to enable the unit to protect itself against internal and external damage.

★ ★ ★

Finishing-Equipment Catalog. A new 146-page catalog describes a complete line of electroplating, polishing and spray painting equipment and supplies.

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By **EDWARD PLASSMEYER**
Chief Engineer
Phillips Manufacturing Co.

Water spotting is a familiar problem to most finishers who operate aqueous finishing baths—electroplating, pickling, phosphatizing, and so on. A recently developed patented process shows promise of eliminating most such difficulties.

Certain cationic surface-active agents dissolved in a solvent such as trichlorethylene or perchlorethylene are strongly adsorbed at the surfaces of metal or glass objects. This means that the organic solvent preferentially wets the solid and displaces the water film.

Thus if a piece of wet metal is immersed in boiling trichlorethylene containing a suitable surface active agent, the surface moisture is displaced by the surface-active agent immediately (Fig. 2), leaving a perfectly water-free surface. The displaced water mixes with the trichlorethylene, forms an azeotropic mixture and rapidly boils away.

Water and trichlorethylene form a constant-boiling mixture (or azeotrope) with a boiling point of 73 deg. C.—nearly 14 deg. C. below that of the solvent by itself.

Obviously this system forms the basis of an efficient process for drying metal articles.

Equipment

This drying process can be carried out conveniently in one piece of equipment—a simple modified trichlorethylene degreaser. A suitable machine is shown in Fig. 3. It consists of two chambers, each heated. The drying solvent is trichlorethylene mixed with a cationic surface-active agent ("Trisec" solvent is an example of a typical drying solvent). Baskets of wet work are immersed in the first compartment for 20 to 30 seconds, where the water is displaced by the drying solvent. The work is then transferred to the second compartment, where it is rinsed free of the surface-active agent in clean

trichlorethylene. During withdrawal from the rinse the clean solvent drains almost completely. Vapor rising from both compartments permits the metal parts to be withdrawn completely dry.

The vapor is condensed on horizontal cooling coils and falls into the solvent-collecting trough. This leads into the water separator, where water is continuously separated and drained off, allowing pure solvent to return to the rinse compartment. The solvent in the rinse compartment continually overflows into the drying compartment, thus completing the self-contained solvent cycle.

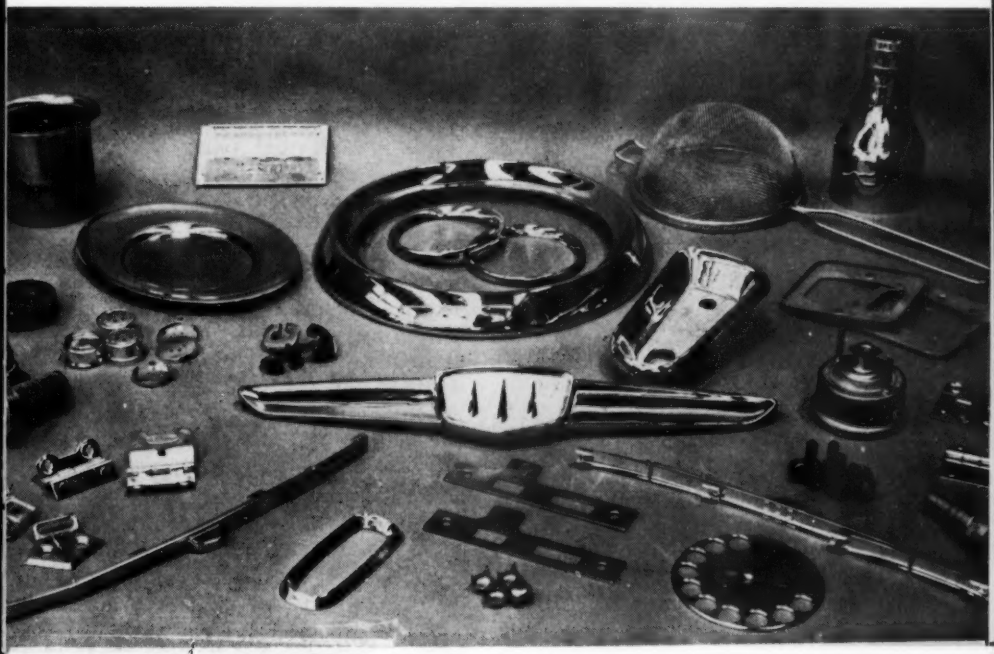
The drying machine is simple and presents no difficulty to those already familiar with trichlorethylene degreasing machines. For maximum service life, the unit should be made of stainless or stainless clad steel. The handling techniques that are employed in degreasing are used with several modifications. It is important for the work to be arranged for free draining to avoid drag out of solvents: some shapes give trouble in this respect and may be rotated in a suitably designed fixture.

Machine maintenance is uncomplicated: the solvent must be kept at the correct level in the drying compartment by the addition of "Trisec." The frequency of recharging the drying compartment and/or cleaning is dependent upon the volume and condition of the work introduced into the machine.

Solvents

Trichlorethylene and perchlorethylene are the two commercially available solvents possessing the physical and chemical properties which make them suitable for use

Fig. 1—Examples of bright plated parts which have been solvent dried by Trisec Process.



with a cationic surface-active agent. The former is preferable because of its lower price and lower heating requirements. "Trisec" is a combination of stabilized trichlorethylene and a special cationic surface-active agent.

Practical experience has shown that a drying machine of the type described above, having a total solvent charge of about 40 gallons of trichlorethylene-"Trisec" solution, removes between 1½ to 2 gallons of water per hour, depending on the method of heating. This is adequate for a medium-sized electroplating shop. These figures have been determined by measuring the amount of water discharged from the water separator. The rate at which water is removed from the work is many times greater than this.

Fig. 2—When wet metal is immersed in trichlorethylene containing suitable surface active agent, all of the moisture is displaced immediately, leaving water-free surface.

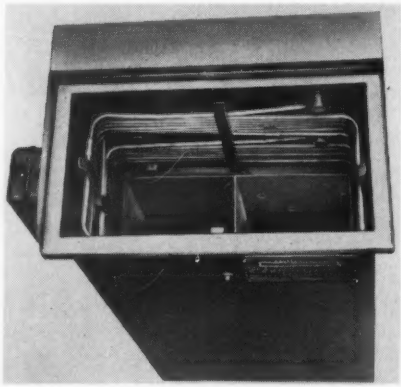


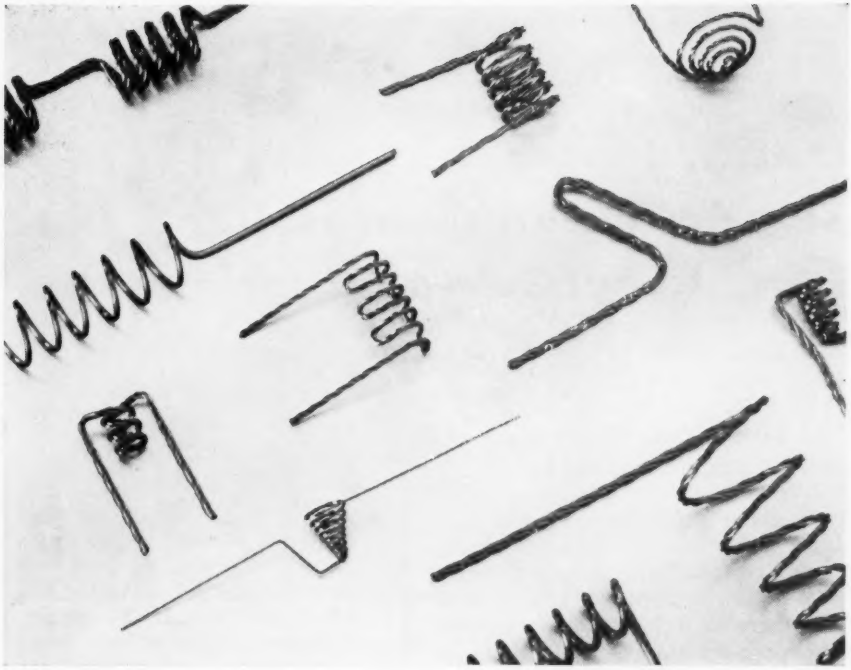
Fig. 3—Typical machine for carrying out Trisec process. (Photographs courtesy Phillips Manufacturing Company, Chicago, Illinois.)

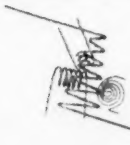
Uses

Although primarily developed for the stain-free drying of electroplated and highly polished parts, this drying system is finding increasing use where speedy and complete drying is essential. Eaxmples are the drying of phosphatized components before spirit staining or painting and the drying of parts which, after heat treatment in molten salt baths, have been washed in water. Other materials may be treated, provided they are not adversely affected by boiling trichlorethylene.

Solvent-drying machines may become an essential part of aqueous finishing processes. Manually operated machines will probably give way to mechanized or fully automatic machines.

"Trisec" is a trademark of Imperial Chemical Industries, Ltd. and the process of drying with "Trisec" is the subject of a United States and British patent pending. Phillips Manufacturing Company of Chicago has been granted a license for the manufacture of the equipment, use of the process and distribution rights in the United States.





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Editor on Tour:

Osaka, Japan; Taipei, Taiwan (Formosa); Hong Kong; Tokyo, Japan

By EZRA A. BLOUNT
Editor

During a 28-day tour of Honolulu, Hawaii; Tokyo, Nagoya, and Osaka, Japan; Taipei, Taiwan (Formosa); and Hong Kong, the editor of PRODUCTS FINISHING visited 23 plating and finishing plants and spoke at numerous technical meetings. This article is one of a series describing this tour.

Osaka, Japan. August 15

The Osaka-Kobe area is a major steel and metal-product-manufacturing center with 300 job plating shops and 35 plants which operate their own plating facilities. It is estimated that there are at least 125,000 gallons of copper solution, 90,000 gallons of nickel, and 30,000 gallons of chromium plating solution in Osaka. Activities for PF's editor in Osaka were arranged by Osaka Plating Industry Cooperative Assn., Plating Friends Association and Electro-Plating Institute.

Asahi Mekki Kogyo K. K. is the largest job plating shop in Osaka, having two large plants, 260 employees. Copper, nickel, chromium, zinc, and cadmium are plated on parts for the radio, electronics, television, electrical appliance industries. Conveyorized paint lines process steel parts through phosphatizing and electrostatic paint coating, infrared baking.

Features of the copper-nickel-chromium operation noted on the inspection tour include tape and clear plastisol rack insulation; many PVC tanks and PVC-lined tanks; air-agitated bright copper solution filtered continuously; air-agitated bright nickel solution filtered continuously; quartz electric immersion heaters used in the tanks; conventional chromium plating solution in use in PVC-lined tank with adequate fume exhaust. Copper plated parts are buffed, and some of the chromium plated parts are buffed.

One building is devoted to barrel plating with one zinc automatic barrel machine 40 feet long (Fig. 1). PVC barrels are used and the tanks are PVC-lined. Chromate bright dips and conversion dips are in use.

(continued)

Fig. 1—Automatic zinc barrel plating machine at Asahi Mekki Kogyo is 40 feet long. Motorized superstructure shown above machine moves over barrel to be removed, lifts barrel and carries it to end of machine where operator unloads barrel. Operator then reloads barrel and carrier replaces it in proper place in the plating machine. Tadeo Ueda (at left, near machine) is president of Asahi Mekki Kogyo Company (P. F. Photograph.)

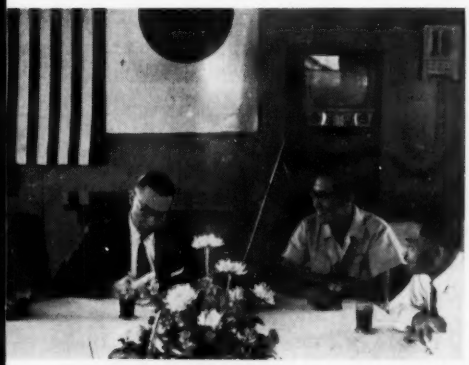

Fig. 2—Conference in meeting room at Sato Senjuro Kogyosho. American and Japanese flags were displayed in honor of the occasion. (Photo courtesy M. Sato.)

Fig. 3—Inspection methods were discussed with plant officials during tour of well-equipped laboratory. (Photo courtesy M. Sato.)

Osaka, Japan. August 16

Sato Senjuro Kogyosho (Fig. 2) is a job plating shop equipped to do hard chromium plating, copper-nickel-chromium plating, zinc plating, brass plating, barrel finishing, silver plating, clear melamine spray painting and baking. A large laboratory is used for routine solution analysis and control (Fig. 3), as well as experimental work and research. Metals plated include zinc base die castings, brass, stainless steel, steel, and aluminum castings, for the automobile, appliance, radio, television, building hardware and other industries.

Fig. 5—At a meeting of Osaka electroplaters, J. Nakanishi (at right) president of Japan Electroplating Industry Assn., was presented with letter of greeting from A. E. S. president, and silver plated gavel as a gift from Ezra A. Blount. Prof. T. Hayashi (center) acted as interpreter.

Fig. 4—M. Sato, executive director of Sato Senjuro, shown by one of bright nickel plating tanks. He designed rack return mechanism used on this semi-automatic plating tank. (Photograph by PRODUCTS FINISHING.)

The company's 100 employees are currently working 10 hours per day, 6 days per week. There is one supervisor in each department, (eight in all) in addition to the plant manager, engineers, and chemical and metallurgical technicians.

The barrel finishing section has both horizontal and tub-type machines designed by Mr. Sato, and includes all necessary abrasives.

Polishing and buffing are done in the conventional manner with some use of abrasive belts as well as set-up wheels. Circular semi-automatic plating tanks are used for bright

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copper and bright nickel. The copper solution is filtered continuously and air agitated, as is the bright nickel. Polyethylene floats are used on the bright copper solution to help control fumes. Other bright nickel tanks are of the rotating-cathode-rod, automatic-return type (Fig. 4). They are diaphragm-type with continuous filtration and electrolytic purification, and have automatic devices for brightener addition.

The zinc plating equipment includes two semi-automatic tanks for rack plating, fed from an automatic pretreatment unit, and several barrel plating machines—one continuous plating machine called a "mass plater." Brighteners are used in the zinc solution, and chromate dips are used after plating.

The hard chromium plating plant is equipped with various types of manual polishing equipment and a lathe-mounted automatic roll or shaft polisher and buffer. Chromium plating equipment and process is conventional. Anodes are steel, lead-coated. Tanks are lined with PVC.

At a meeting of Osaka electroplaters held August 16 in the Imabashi Club, PF's editor presented talks on "Nickel and Chromium Plating," and "Plating Waste Treatment," showed films on "Hard Chromium Plating" and "Automatic Polishing." The meeting was opened by J. Nakanishi, president of Kansai Electroplating Co., Ltd., chairman of the Osaka Electroplating Assn., and president of Japan Electroplating Industry Assn. Mr. Nakanishi was

(continued)

Fig. 6—M. Ogata, executive director of Ogata Mekki Kogyo, (at right) points out operating features of semi-automatic zinc barrel plating machine to Ezra Blount. Zinc solutions are continuously filtered, and cooled by recirculating through heat exchangers.

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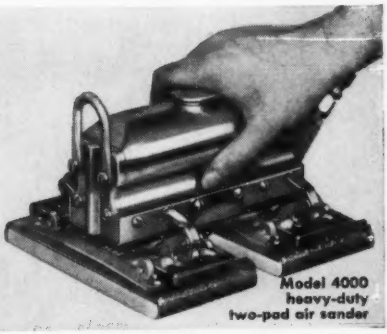

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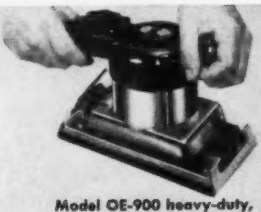

Model OE-900 heavy-duty, high-torque electric sander

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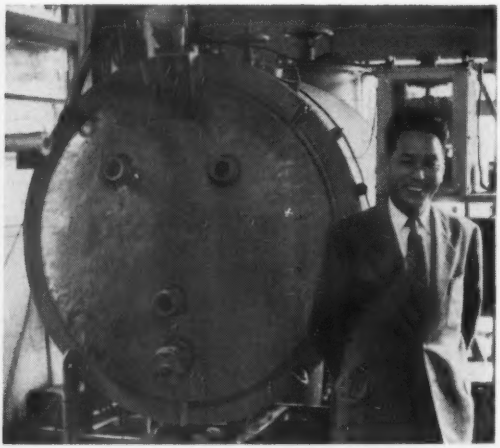


Fig. 7—Mr. Ogata shown in the vacuum metallizing department of his job plating shop. Like American electroplaters, Japanese job platers often buy vacuum metallizing equipment when they wish to diversify. (Photograph by PRODUCTS FINISHING.)

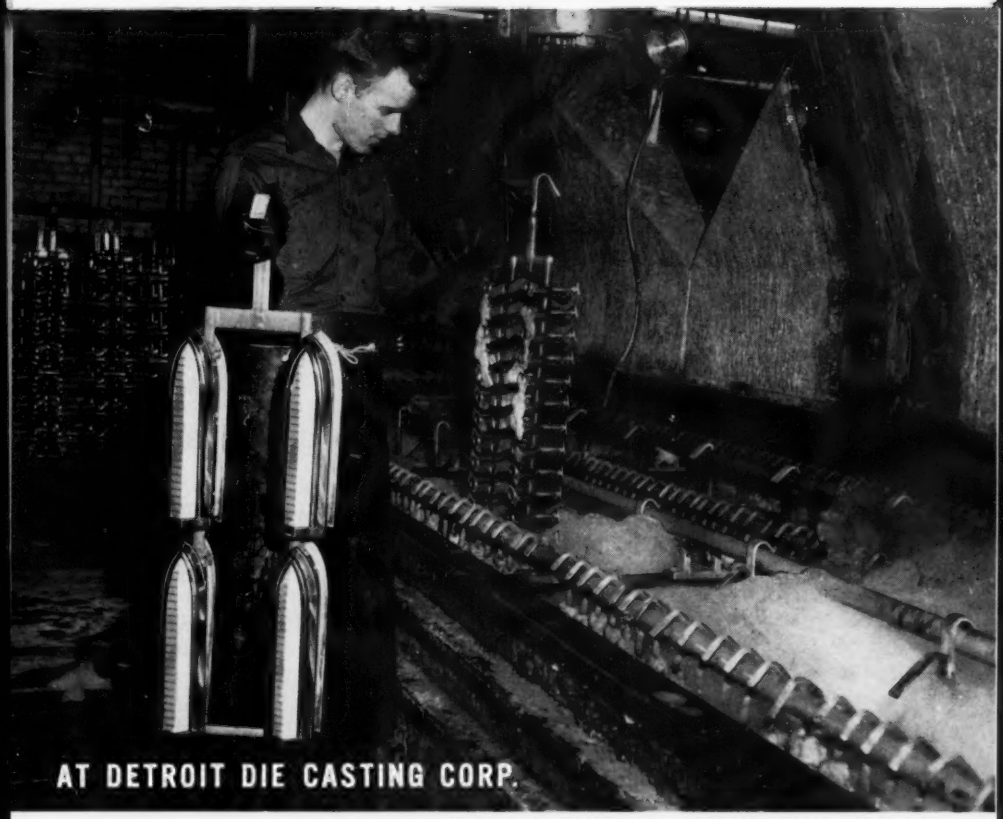
then presented with a letter of greeting from the president of the American Electroplaters' Society, and a silver plated gavel as a gift from the speaker (Fig. 5). PF's editor was introduced by S. Nagayama, president of Nihon Token Shizai Co., Ltd., Tokyo. Prof. T. Hayashi, University of Osaka Prefecture, served as interpreter throughout the meeting. A reception for the speaker was held immediately following the meeting. Attendance: about 180.

Osaka, Japan. August 17

Ogata Mekki Kogyo K. K. is a job plating shop performing barrel and rack zinc plating, copper-nickel-chromium plating, cadmium plating, and vacuum metallizing. Principal operation is the plating of nuts, bolts, and other parts for the hardware industry.

(continued)

Fig. 8—American and Japanese flags were displayed at the entrance of the main building of the Osaka General Vocational Training Center when PRODUCTS FINISHING's editor, accompanied by a committee of Osaka electroplaters, visited the Center. Head of the Training Center is T. Ikejiri (at right of Ezra A. Blount). (Photograph by M. Ogata.)



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"The vacuum metallizing equipment in this plant is used for producing interference films on glass."

The plant features both automatic and semi-automatic equipment. One semi-automatic zinc barrel machine (Fig. 6) holds 11 barrels (12-by-30-inch) at one time, with efficient loading and unloading facilities. Another semi-automatic is designed for plating small parts, employs 6 by 12-inch barrels. Another machine is used for cadmium barrel plating. There are facilities for rack plating with zinc. Zinc solutions are cooled by means of continuous circulation, and are filtered continuously.

A double-lane automatic cleaning and copper strike machine, designed by M. Ogata, prepares racked parts for copper plating. The vacuum metallizing equipment in this plant (Fig. 7) is used for producing interference films on glass.

The Osaka Electroplating Association maintains testing and research offices, laboratory facilities, and classrooms at the headquarters location. Classes in electroplating are held each week. Members may call on the 25-year-old association for help in solving problems.

The Osaka General Vocational Training Center (Fig. 8) is the largest of 40-odd such institutes in Japan, with 600 students. This institute, like the others, trains men to be foremen as well as skilled workers in many fields. The various institutes are organized under the Japanese Ministry of Labor, with each prefectural (state) government paying the cost of operation of its own training center. Students may be high school graduates, college graduates, workers displaced by industry changes who wish to train for another field.

Courses are usually of one year duration—48 hours per week, 52 weeks per year (5 or 6 days vacation). The Osaka Center is now only one year old, and all the buildings

(continued)

Fig. 9—In the clean, well-lighted buffing shop of the Osaka Training Center, students learn buffing techniques, proper use of wheels, buffs, and compounds. Students train intensively—48 hours a week, 52 weeks a year. (Photograph courtesy M. Ogata.)

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have not been completed. The center will be completed in three years. The Osaka Center has graduated 24 students for the electroplating industry in its first year, and now has 25 students in the school. Facilities include a most modern buffing and polishing room (Fig. 9) extensive chemical laboratories for process control and for chemical analysis, small plating tanks for experimental work, large plating tanks for production scale plating.

Fig. 10—PRODUCTS FINISHING's editor with Dr. R. Tomono, director of the Kyoto Prefecture Machine Industry Training Institute. Many new electroplating techniques have been developed in this well-equipped and staffed research center.

Fig. 11—Dr. Tomono describes some of his work on the development of a bright copper plating solution. (Photograph by M. Sato.)

Kyoto, Japan. August 18

A laboratory where research and development of electroplating processes is conducted is called the Kyoto Prefecture Machine Industry Training Institute. This laboratory, under the direction of Dr. R. Tomono (Figs. 10, 11) has developed smooth and bright plating solutions for plating copper, zinc, cadmium, and other metals, now used in some 600 plating shops. Both electrical conditions as well as bath composition have been studied. Many modern devices used in plating research and testing—most of them of Japanese design and manufacture—are used in the institute's laboratory. The expenses of this organization are paid by the Kyoto government, and the results of the developments made are available to platers in the Kyoto Prefecture.

Osaka, Japan. August 18

In the two-building plant of K. K. Taiyo Kosakusho, plating of zinc on steel is done automatically on a large machine about 120 feet long. The cycle includes chromate dipping, lacquer dipping and infrared drying. Facilities include zinc barrels, still tanks, and semi-automatics. The products are plated for the radio and television industries. About 30,000 gallons of zinc solution are in use.

Aluminum parts for the appliance industry are electropolished in a chromic-phosphoric solution, (Fig. 12) then anodized in sulfuric acid.

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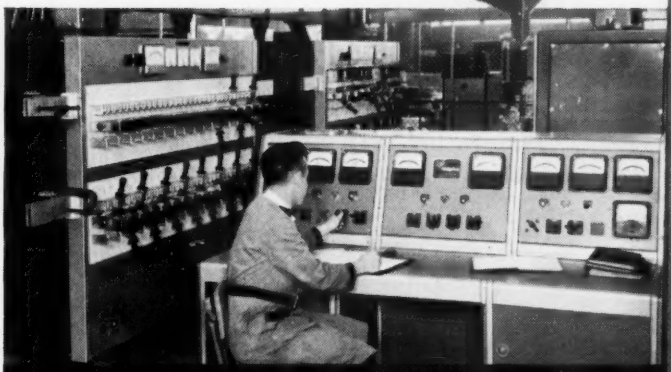

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Tokushu Kika Kogyo K. K. performs hard chromium plating on steel products for various industries. This company originated the plating of hard and thick chromium in Japan. Large rolls are polished and buffed (Fig. 13) prior to plating, and after plating if necessary. Large rolls may be rotated during plating.

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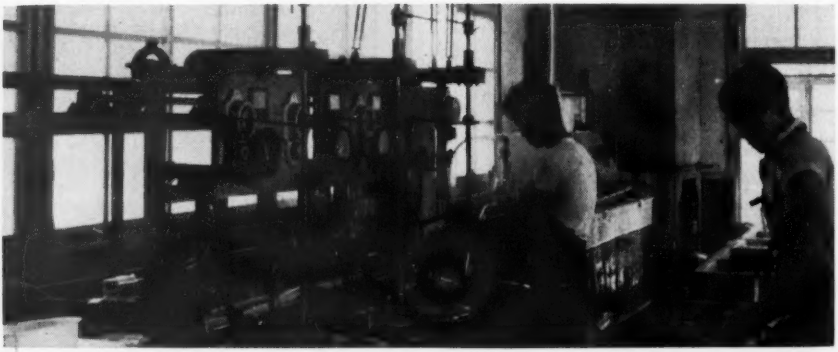
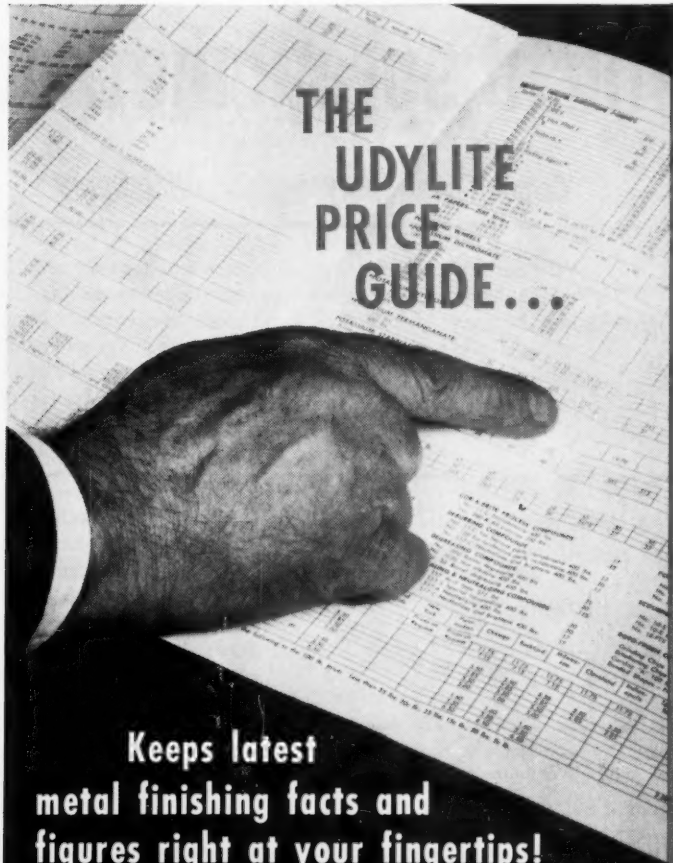


Fig. 12—Aluminum electropolishing installation in Taiyo Kosakusho. Following electropolishing, parts are anodized in sulfuric acid solutions located in the area behind workers.

Fig. 13—Installation for polishing large rolls prior to hard chromium plating in Tokushu Kika K. K. Abrasive "flap wheel" (right foreground) oscillates back and forth across face of the rotating roll. Various polishing wheels and buffs can be used to produce the desired surface finish. S. Furuichi (left) is president of the company. (Photo by M. Sato.)



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Which spray method

	Conventional Spray	Hot Spray
IT ALL DEPENDS ON object size and form	Whether it's a missile or a light-bulb filament, conventional spray is practical with its wide selection of nozzle combinations and gun types.	Comparable to conventional spray for versatility and range of service. Permits heavier coating of vertical surfaces without runs or sags —better film build on corners and edges.
where you paint	Practical almost anywhere, indoors or out. If spraying is prolonged, good ventilation is recommended.	The only method suitable for painting where temperatures are low or fluctuating. Because overspray is all but eliminated by this method, intermittent spraying may often be done in the absence of a spray booth.
properties of the coating material	Wide selection of nozzle combinations and gun models will handle practically every type of liquid or mastic, including highly abrasive ceramics and other coarse materials.	Lacquers, enamels, and organic materials whose viscosity is reduced by higher temperatures (under 180°F) are best suited to hot spray. Wide range of caps and tips allows selection of any type pattern or width desired. Sprays at lower pressures.
speed of application	Rate of application is extremely wide to meet average and special needs. Adaptable to automatic processes with multiple guns where high rate of coating is needed.	Comparable to conventional spray in all respects, with added advantage of heavier film builds if desired.

will work best for you?

Airless Spray

Broad, plain surfaces provide the best opportunity for this method. Small objects or narrow surfaces (under 3") reduce efficiency.

Ideally suited for spraying inside cavities, enclosures or wherever paint rebound may be a problem with other spray methods.

Well suited for light or heavy liquid paints of relatively fine grind that do not contain abrasive pigments.

Produces a very large spray pattern for ultrafast coverage of large areas where close control is not a necessity.

An analysis of the job at hand, of the conditions under which painting must be done, of the type and quality of finish desired —all are important factors determining which spray method is best suited to your job.

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Ampere-hour meters signal the end of the plating cycle. Automatic temperature controls maintain correct solution temperature. Chromium plating tanks are covered with vinyl sheets to reduce fume loss and make exhaust of fumes more positive and complete.

Murata Industrial Co., Ltd., is a manufacturer of automatic and semi-automatic plating equipment, and buffing compounds. The company also represents Hanson-Van Winkle-Munning Co. in Japan. S. Murata, president of the company, was formerly associated with the late A. P. Munning during the time that he lived in Japan and managed the K. K. A. P. Munning Co.

Taipei, Formosa. August 20

There is more manufacturing on Formosa than is generally realized. Since much of the manufacturing concerns metal products for both industrial and consumer markets, there is some volume of both painting and electroplating done.

Tatung Engineering Co. manufactures electric fans for the consumer market, electric motors and watt-hour meters for use by industry. The company is the largest of its kind in Formosa. It includes a die shop, fabricating plant, plating and painting shops and assembly plants.

Steel or zinc die cast parts are polished and buffed as required, then copper, nickel, and chromium or zinc plated as specified. Parts to be painted are cleaned and phosphatized, then prime coated and finished with a gray melamine baking enamel. Both electrostatic painting and hand spray are employed. Finish coats are baked at 280 deg. F. for 30 minutes.

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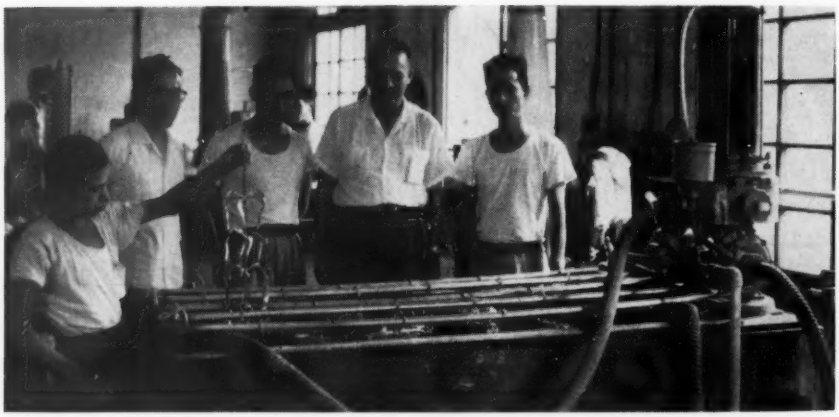

Fig. 14—Bright nickel tank in plant of Wu Shun Bicycle Works, Taipei. Note filter mounted on end of tank for continuous filtration of solution. Company engineers and representatives from China Productivity & Trade Center are shown. (PRODUCTS FINISHING photo.)

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"The brighteners are obtained from Japan and Canada."

Tang Eng. Iron Works Co. is a manufacturer of metal telephone booths and bus bodies. The bus bodies are assembled and finished in one building. Metal is prepared for painting by acid pickling and priming. Paint is sprayed on manually.

Wu Shun Bicycle Works, Inc. manufactures 2,000 bicycles per month. Parts are fabricated, zinc or copper-nickel-chromium plated, or painted prior to assembly. Parts are polished with set-up wheels, copper plated, copper buffed, bright nickel plated (Fig. 14) and chromium plated. There is some buffing of the nickel prior to chromium plating.

Copper and nickel solutions are air-agitated and filtered continuously. Anodes are bagged. The brighteners are obtained from Japan and Canada. Parts to be painted are dipped or sprayed and then baked. A

(continued)

Fig. 16—Bright nickel plating at Tang Fun Kee Mfg. Co., Hong Kong. Racks are insulated with Kote-Rax plastisol. 400-gallon tank is heated with electric immersion heaters. Depolarized anodes are bagged. (PRODUCTS FINISHING photo.)

Fig. 15—Conference on plating and paint finishing held at the office of the China Productivity & Trade Center, Taipei, Formosa. Engineers from manufacturing plants attended.

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primer and black finish coat constitute the finishing system.

Yung Koo Paint & Varnish Co. is the third of 60 paint manufacturing companies on Formosa. The company manufactures its own resins and sells some resins to other paint companies. Industrial finishes and house paints are produced. The product line includes vinyls, epoxies, acrylics, various other lacquers and enamels.

Company officials state that wider application of more modern paint finishes on Formosa is hampered by: lack of infra-red baking equipment; lack of metal pretreatment facilities.

Yue Loong Engineering Co., Ltd., is a manufacturer of diesel engines, trucks, and passenger cars. The company has complete fabrication facilities from cast iron foundry to plating and paint finishing departments. Car parts are nickel and chromium plated for decoration; some engine parts are hard chromium plated for wear resistance. Zinc and cadium are plated on some parts. Parts to be painted are phosphatized, primed with a wash primer, then finish coated and baked in an infra-red oven.

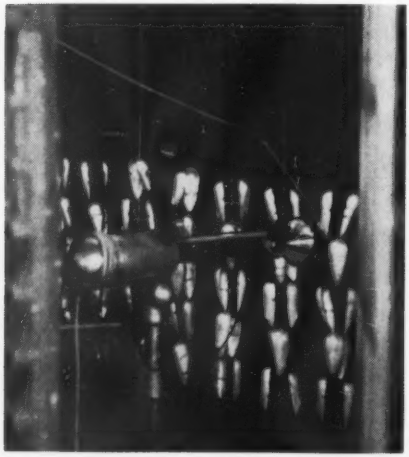

Fig. 17—Cases for bicycle lamps are sprayed with metallic lacquer electrostatically at Tang Fun Kee Mfg. Co. Conveyor takes parts through infra-red oven for drying. (PRODUCTS FINISHING photo.)

This large plant is the only manufacturer of automobiles in Formosa. At present it employs 1,000 workers.

Taipei, Formosa. August 22

A meeting was held under the auspices of the China Trade and Productivity Council which was attended by finishing engineers from the leading manufacturing companies in Taipei (Fig. 15). The meeting consisted entirely of a question-and-answer session devoted to the subjects of copper-nickel-chromium plating, phosphatizing and paint finishing. The finishing industry on Formosa suffers from lack of equipment and materials. The engineers and technicians are well trained and do an excellent job with the facilities at hand.

Hong Kong, B. C. C. August 26

The finishing industry in this area appears to be concerned with the manufacture of flashlights, bicycle lamps, watch bands, and other small products for export. There are a few large manufacturing plants with 1,000 workers or less, and some 50 to 60 job plating shops with 10 to 20 employees. The products and equipment used in these shops are of American, British, or German manufacture. The American materials are brought into Hong Kong through the British affiliate of the American supplier.

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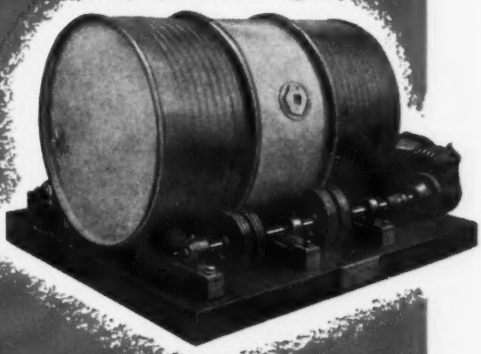

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Fig. 18—Watch bands are bright nickel plated for 15 minutes prior to a rose gold final plate at Shui-Kwang Co., Hong Kong. Anodes are bagged; racks insulated with tape; solution heated to 110 deg. F. by electric immersion heaters; tank is rubber-lined steel.

Fig. 19—Conference with Jiro Takahama, 77-year-old secretary of Japanese Electroplating Society. Mr. Takahama is shown discussing some ancient reference books on plating which he has collected. He has received honors from the Japanese government for his research and various published works on a number of subjects. (Photo by Y. Inoue.)

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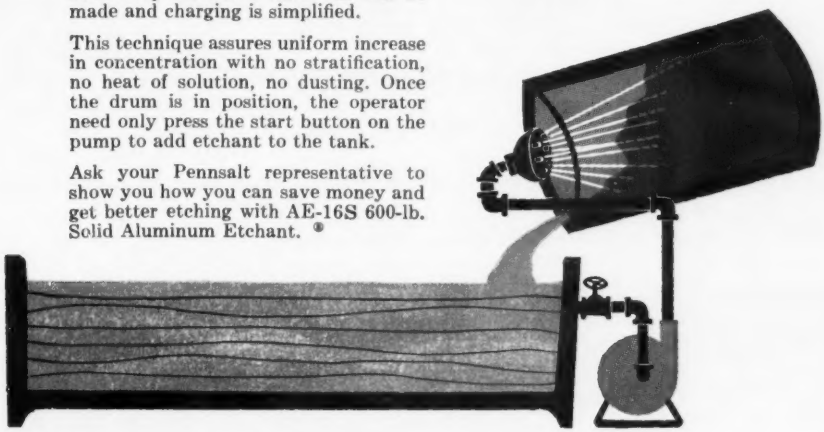
Gives push-button control. A 600-lb. drum of Pennsalt AE-16S Solid Aluminum Etchant is positioned over etching tank; etchant solution is pumped from tank to a specially-designed spray nozzle head which is placed in drum opening; spray nozzle sprays solution directly on etchant, dissolving it at a uniform rate; concentrated solution then returns to tank through holes punched in lowest part of drum head. Within minutes, accurately measured additions can be made and charging is simplified.

This technique assures uniform increase in concentration with no stratification, no heat of solution, no dusting. Once the drum is in position, the operator need only press the start button on the pump to add etchant to the tank.

Ask your Pennsalt representative to show you how you can save money and get better etching with AE-16S 600-lb. Solid Aluminum Etchant. ®



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The Tang Fun Kee Mfg. Co. is the largest manufacturer of flashlights in the Far East. Some 800 employees working in a four-story plant produce 2,500 flashlights per day plus a substantial quantity of other lamps and watch bands. The fabrication and most of the finishing are done in this plant. Brass, aluminum, and tin plated steel sheet stock are finished. The aluminum is buffed, electropolished, chemically polished, anodized and dyed as required. Brass is buffed, nickel and chromium plated. Tin plated steel stock is copper, nickel and chromium plated. This stock is bright enough to be plated without buffing.

Soak cleaning with hand scrubbing is used in metal preparation. Conventional cyanide copper is used; both dull nickel and Hanson-Van Winkle-Munning Nickel-Lume (Fig. 16) bright nickel are employed. Conventional chromium plating solutions are used. There are facilities for both barrel and rack plating. Chromate conversion coatings are applied on zinc plated parts.

Some parts are lacquered by electrostatic spray (Fig. 17) and dried in an infra-red oven on a continuous conveyor. Hand spray painting is done also. Flashlights are assembled on moving belt assembly lines which carry the products from station to station and to the inspector and packers.

Wing-Wa Plating Co. employs 70 workers to copper-nickel-chrome plate flashlight parts and other items principally for Tang Fun Kee Co. One 300-gal. H-VW-M bright nickel tank plus other necessary tanks are in use.

(continued)

Fig. 20—Discussion meeting held at headquarters of Japanese Electroplating Society. Note display cases along wall at left containing examples of various kinds of electroplating done by members of the society. (Photograph taken by M. Fukui.)

NEED HEAVY BUILDUP FOR RESIZING, ELECTROPLATING, ELECTROFORMING OR OTHER FUNCTIONAL USES? EXPERTS AND USERS AGREE: NICKEL SULFAMATE IS THE MOST SUITABLE BATH FOR FUNCTIONAL NICKEL PLATING.

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MECHANICAL PROPERTIES OF DEPOSITS ARE CONTROLLABLE

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Editor on Tour . .

Shui-Kwang Co. manufactures and plates brass watch bands. The bands are finished in nickel and chromium or gold. Sixty employees turn out 600 dozen watch bands per day. Parts are buffed, cleaned, nickel plated in Harshaw Nubrite (Fig. 18) bright nickel and chromium plated. Nickel plated parts are not buffed.

Tokyo, Japan. August 28

Final meeting with Japanese electroplaters was a conference with Jiro Takahama (Fig. 19), secretary of the Japanese Electroplating Society and editor of "Mekki" (Plating). This was followed by a discussion meeting with society leaders (Fig. 20). This meeting was held in the headquarters of the society, which is in Tokyo.

At this time a letter of greeting from the president of the American Electroplaters' Society was presented to K. Yahata, who is the president of the Japan Electroplating Society. The Japan Electroplating Society differs slightly from other groups of platers in Japan, in that it is scientific and technical, yet social in nature. The society publishes a monthly magazine, conducts technical meetings, and maintains in its headquarters an interesting exhibit of parts plated by its members. The Society is now 12 years old.

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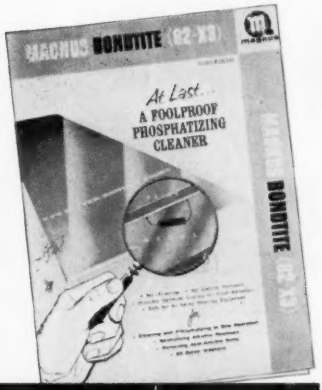

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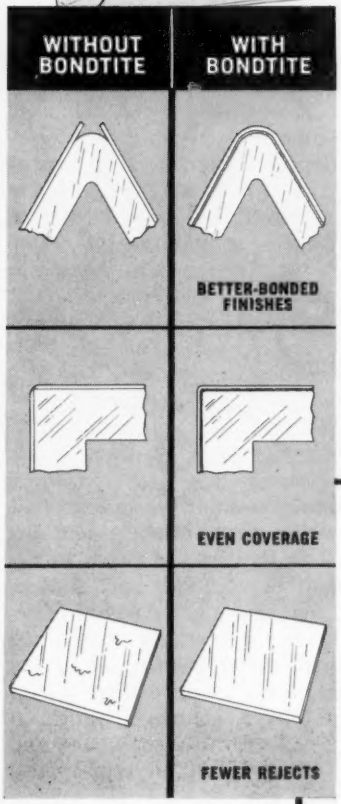

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Dr. Nelson F. Murphy, Research Professor of Chemical Engineering, Virginia Polytechnic Institute

Electrophoretic Deposition

Electrodeposition of non-conducting materials such as rubber, synthetic polymers, inorganic oxides, and ceramic materials has been known and used in industry for many years. Any non-conductive material which exists in a finely divided state in an inert medium can be deposited on an electrode. Coagulation occurs because of the high potential existing in the vicinity of the electrode or because of coagulating ions which are formed at the electrode.

Particles of rubber latex for instance, behave as large negatively charged ions, which, in the electric field, are transported toward the anode and coagulate thereon. The coagulated latex may then be further separated from the fluid and compacted as the potential drives the solvent out of the films.

The colloidal particles of the latex will move through the solution at a rate proportional to the potential gradient and also proportional to the size of the colloidal particle. Sulfur, fillers, pigments and softeners can be added to the suspension in finely divided form, and after deposition is complete, such mixtures can be readily vulcanized.

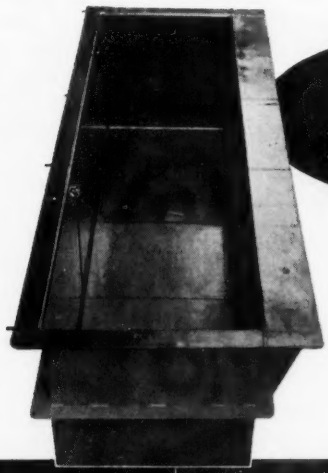
The anodes upon which the substance deposits are chosen to form a stable oxide film compatible with the rubber deposit. Zinc and copper anodes have been found suitable. For a typical rubber deposition the anode current density is from 7 to 22 a.s.f., and the voltage 10-100 volts. About 1.2 to 1.5 grams of rubber were deposited per ampere minute. This corresponds to an equivalent weight of 1900-2400 grams per Faraday.[1]

The conductivity of suspensions used for electrodeposition of rubber are generally low and this means that the throwing power of such solutions also is low. By taking pains in arrangement of cathodes and anodes, corners and edges are covered.

The same procedures which are used for electrodeposition of rubber have been used for deposition of synthetic polymers, lacquer coatings on tin cans and metal components, and cellulose. Gray and Jenkins[2] have reported the use of electrophoretic deposition of mixtures of alkali

(continued)

A TANK LINING FOR EVERY SOLUTION



Amer-Plate®
PVC TANK LINING

Whether your plating and processing tanks are steel, concrete or wood, Amer-Plate can protect them indefinitely against corrosive solutions. Amer-Plate is a dense thermoplastic sheet made from high polymer vinyl chloride resins molded under high pressure and temperature.

- **It is unaffected by strong acids and oxidizing materials.**
- **It is non-toxic in food and beverage service.**
- **It is impervious to diesel oil, sour crude, aliphatic petroleum hydrocarbons.**
- **It will withstand hard chrome liquor to 160°F.**
- **It is resistant to highly corrosive salts.**
- **It resists alkalis including 50% caustic soda.**
- **It is insoluble in aliphatic alcohols, glycol and glycerine.**

Amer-Plate adheres not only to steel but also to concrete or wood without costly metal interlining. It is ideal as a membrane under acidproof brick construction. Amer-Plate is also supplied with a T-ribbed back for casting into place in new concrete tanks. Applicators are strategically located throughout the U.S. and Canada.

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metal carbonates with an organic binder on vacuum tube cathodes. Levine[3] has shown that oxides of tantalum, zirconium, molybdenum or tungsten may be deposited on metal surfaces. Electric insulating coatings of ceramic material have been formed on vacuum tube supports and vitrified after formation.

Werner, Shyne, Barr, and Trifflemann[4] have formed protective coatings on molybdenum to protect the surfaces during long-term operation in oxidizing atmospheres to temperatures as high as 2500 deg. F. Without a suitable protective coating, molybdenum oxidizes rapidly above 1450 deg. F.

These authors have found that a coating of 80 per cent nickel-20 per cent chromium affords the most satisfactory protection for molybdenum. This coating on molybdenum was prepared by electrophoretic deposition from a dispersion made by ball-milling the following mixture for one hour: 118.9 gm. of nickel oxide, 31.1 gm. of 80 per cent chromium-20 per cent nickel powder, 500 gm. of 1-nitro - propane and 2.5 gm. of Ethocel N-10. After reduction and sintering of the deposit, the metallic coating was obtained.

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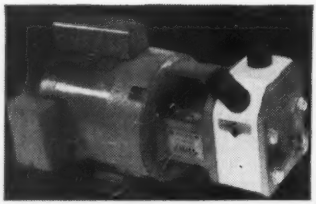

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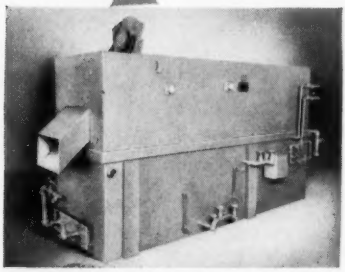

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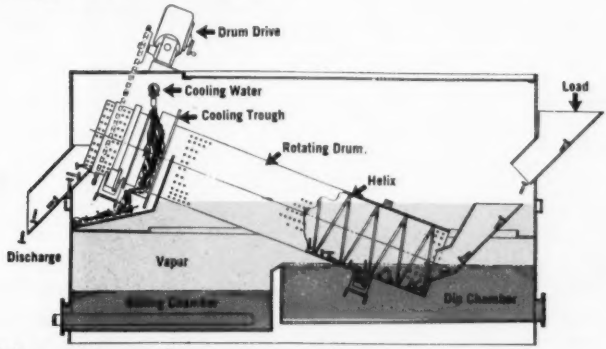

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Electrophoretic Deposition . . .

The coating was formed at 250 volts in 30-60 seconds. Rate of formation was approximately 100 mg. per sq. cm., per min. The stirred slurry was contained in a stainless steel beaker which acted as anode, the molybdenum panel being used as the cathode.

After air-drying the panel for 30 minutes it was heated at 300 deg. F. for an additional 30 minutes. The coating was then reduced in hydrogen at a temperature (750 deg. F.) below the sintering temperature of the coatings, followed by isostatic pressing at 40 tons per sq. in. and pre-sintering at 1470 deg. F. Further pressing at 50 tons per sq. in. and a final sintering at 2000 deg. F. completed formation of the coating. Difficulties were encountered in obtaining a coating over the whole panel in one operation, since attaching the lead wire resulted in a hole in the coating.

The panels were subjected to air oxidation tests, ballistic impact tests, sand blast erosion tests and thermal shock tests. Under air oxidation the test panels withstood as much as 500 hours at 2,000 deg. F. Under erosion tests at 1,800 deg. F. the panel failed after 237 hours. Under thermal shock, using a cycle of heating to 1,800 deg. F. in 30 seconds and cooling to 200 deg.

(continued)

GOLD SICON® withstands 500°F.

Gold SICON protects the grill and grill pouch of this attractive Quaker space heater under temperatures of over 500°F., without peeling, flaking, powdering or discoloring. *And it will retain its bright appearance indefinitely!* Do as Heil-Quaker did. Test SICON . . . up to 1000°F. for Sicon-Aluminum or black . . . from 500° to 650°F. in gold or other decorative colors. Write for Sicon brochure and free sample offer . . . today! Write to Dept. L-6.

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Simply spray "Liquid Envelope" on clean booth with your regular spray equipment. When overspray accumulates, peel it off in big sheets. Costs less than hand scraping or grease-papering. Safer too . . . flame proof, fireproof.

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F. in 45 seconds no detectable damage was observed during 200 cycles.

This method may be useful in producing a corrosion resistant coating on metals other than molybdenum. Possibly a protective film could be formed on aluminum, zinc-base die castings and other soft metals of commerce. Coatings of ceramic oxide, cermets and other non-metallic films shows promise as subjects for further investigation.

REFERENCES

(1) Mantell, C. L., "Electrochemical Engineering," McGraw-Hill Book Co., p. 135-137, 4th ed., 1960.

(2) Gray, L. E. and R. O. Jenkins, "Electronic Engineering," *26*, 402(1954).

(3) Levine, I., U. S. Patent 2,576,129-(1951).

(4) Werner, A. C., Shyne, J. J., Barr, H. N., and Triffleman, Bernard, PB 131062; WADC Technical Report 56-521(1957).

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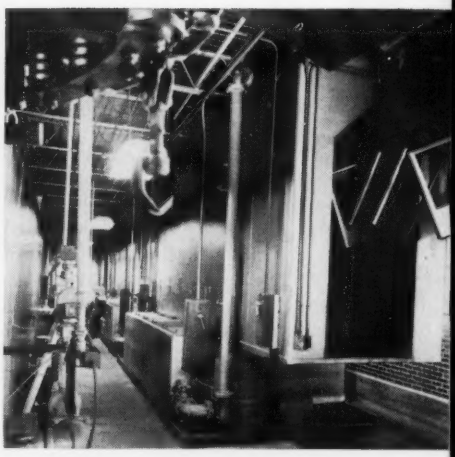
Five-Stage Cleaning Beats "Burn-Off" for Economy

"Burn-off" in a high-temperature oven is a simple, economical method of removing grease from sheet metal parts. It is hard to beat from an operating-cost standpoint.

But a switch from a high-temperature burn-off to a low-temperature metal cleaning system has cut costs and provided other dividends for the Columbus, Ohio, division of Lennox Industries:

- It enabled the company to double-up processing operations through a single cleaning system.
- It provided increased cleaning efficiency by getting rid of soot, dirt and grease.

The five-stage cleaning unit and a dry-off oven were designed and manufactured for Lennox by The R. C. Mahon Company, Detroit.

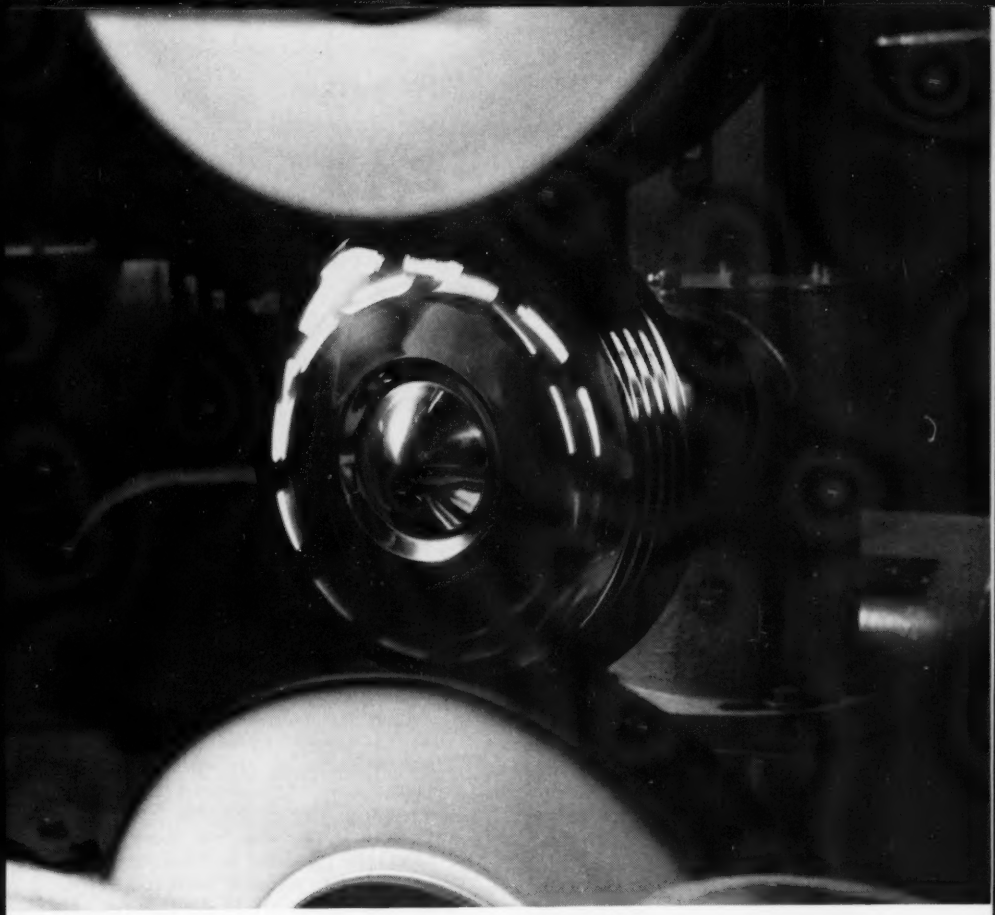


New cleaning and rust proofing system at Lennox Industries doubled up processing operations. At right is entry end of Mahon five-stage cleaning machine. Gas burners, left, are for dry-off oven. (Photo courtesy R. C. Mahon Co., Detroit).

Original reason for installing the washer was to avoid having two systems: one to phosphatize air-conditioning units and one to burn grease from furnace parts. Air conditioners, not produced before, require phosphatizing before painting.

The burn-off oven used previously operated at 700 deg. F. Maintenance cost was high because burner tiles were broken frequently by parts dropping on them, and the high temperatures were hard on the conveyor chain and trolley. Operating cost of the single-purpose system was $4.53 per hour.

Installation of the washer-dry-off was made without increasing floor space. The equipment fits in a 32-by-140-foot open court.



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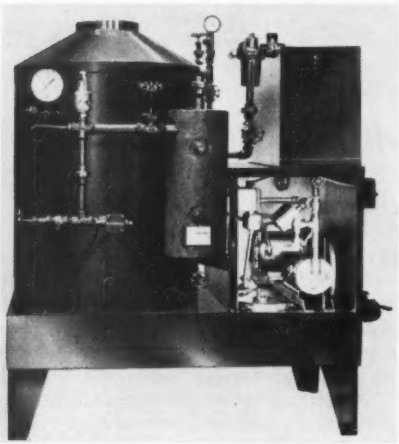
Steam for Plating Shops in 2-3 Minutes

Flash-type, continuous-coil steam generators that are capable of producing live steam in 2 to 3 minutes from a cold start now are being made in 5, 10, 15 and 30 bhp. sizes for plating shops by Malsbary Manufacturing Co.

Each is a complete package, so compact it can be installed near the point of use, thus saving expensive piping.

Flash-type, continuous-coil produces quick steam without a boiler. Burner operates only when steam is needed.

All are designed for use singly or in multiples, thus enabling the user to start with one unit and add others as his plant grows.



Malsbary Flash-Type Steam Generator

Manufacturer: Malsbary Mfg. Co., 845 - 92nd Ave., Oakland 3, Calif.

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Polishing Composition Saves Abrasives, Improves Finish

A product called Myers Miracle is said to grease, polish and preserve abrasive belts in one operation. It is recommended for use on all metals. The manufacturer reports that a 280-grit belt is suitable for most metals when this product is used and that somewhat less effort is required to produce a bright finish. Reduction of compound and buff costs are also said to accrue from use of Myers Miracle.

Manufacturer: Myers & Ellis, Inc., 10 S. LaSalle St., Chicago 3, Ill.

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"Packaged" Air Make-Up Units

J. O. Ross Engineering Division of Midland-Ross Corporation has introduced seven "packaged" air make-up units for use wherever outside air must be brought inside the plant to replace air exhausted in processing operations. The units are available for supplying 20, 30, 40, 50, 60, 70, and 80,000 c.f.m.

Each air make-up unit has a sheet-

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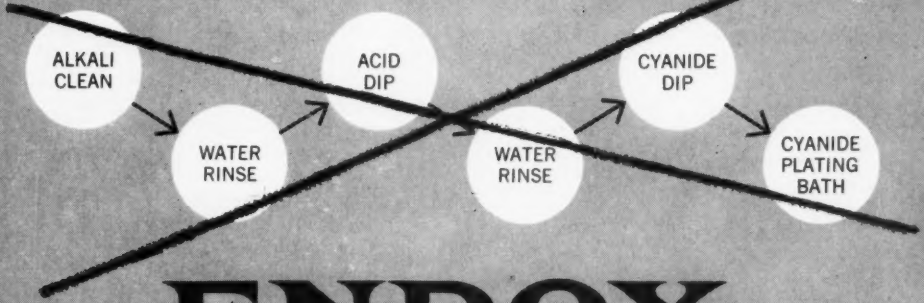

ENDOX

the PATENTED alkaline deoxidizing process prepares steel for plating in one simple step!

In one, simple electrolytic operation, Endox completely removes rust, scale, smut, soil and oxides from steel and activates it for plating. On work that has been precleaned to remove heavy solid soils, no alkali cleaner, acid dip or cyanide dip are required. Endox replaces them all and gives superior plate adhesion, especially on difficult-to-activate alloy steels. Acid attack and acid fumes are eliminated by use of this room-temperature, alkaline process.

Endox cuts rinse water volume (and rinse water waste treatment costs) way down since there's only one brief rinse in the entire cycle prior to plating in a cyanide plating bath. Endox solutions contain sodium cyanide and are compatible with all cyanide plating solutions.

Endox also produces excellent results prior to acid plating baths. It has solved many problems involving adhesion of nickel plate to malleable iron and alloy steel parts which are later subjected to stress. Prior to acid plating, however, the alkaline Endox residue should be neutralized by a dilute acid dip or "sour rinse".

Endox can be used in both barrel and rack plating lines. Endox solutions are very economical to use because they can be maintained indefinitely by periodic analysis and replenishment, just like a plating bath.

Enthone pioneered alkaline deoxidizing and derusting and first introduced such techniques in 1951. In recognition of this, Patent No. 2,915,444 has been awarded to Enthone. Benefit from our long experience in alkaline pickling; write for literature on Endox and the name of your nearest Enthone representative who will be glad to process sample parts for you. Enthone, Inc., 442 Elm Street, New Haven, Connecticut.

ASARCO

ANOTHER PRODUCT OF Enthonics RESEARCH

ENTHONE

A Subsidiary of American Smelting and Refining Company

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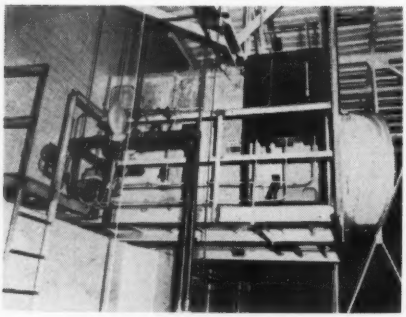


Ross "Packaged" Air Make-Up Unit

metal enclosure, approximately 7 feet high by 7 feet wide by 8 feet long. One end of the unit fits an outside wall opening and is equipped with intake louvers, bird screens, and shut-down dampers. The other end is equipped with a fan which draws the air from out-of-doors into the plant.

A gas burner inside the enclosure heats incoming winter air to 80 deg. F. prior to distribution.

Fuel supply is automatically regulated to heat incoming outdoor air to the desired temperature.

Manufacturer: J. O. Ross Engineering Div., Midland-Ross Corp., 730 Third Ave., New York, N. Y.

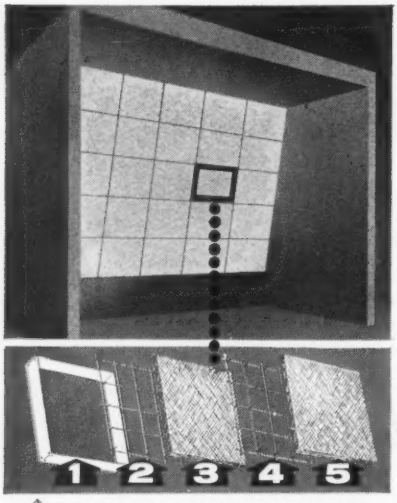
For more data circle **3** on Postpaid Card

★ ★ ★

The Hinac Process: Commercial Application of Colored Coatings on All Metals from a Single Bath

The Hinac Process, which makes it possible to color coat all types of metal products by a single chemical surface treatment, is now available for commercial application. Pennsalt Chemicals Corporations has acquired patent rights for the process, will market it.

(continued)



A Paint Arrestor module consists of a Holding Frame (1), two Snap-in Grids (2 and 4), two Paint Arrestors (3 and 5). Loaded Paint Arrestors are simply replaced as necessary. And, they're also ideal for air-borne ink, mist, dye, frit, etc.

CONTROL PAINT OVERSPRAY the inexpensive, effective way!

The advantages of R P Paint Arrestors, the inexpensive, disposable air filters are many. Overspray solids are trapped before they reach the exhaust stack...to reduce fire hazards, damage to adjacent property...disagreeable and time-consuming maintenance work. Installation? —easy and fast. Maintenance? —remove loaded Paint Arrestor and replace a new one. Adaptability? —ideal for any type, any size booth, new or existing.

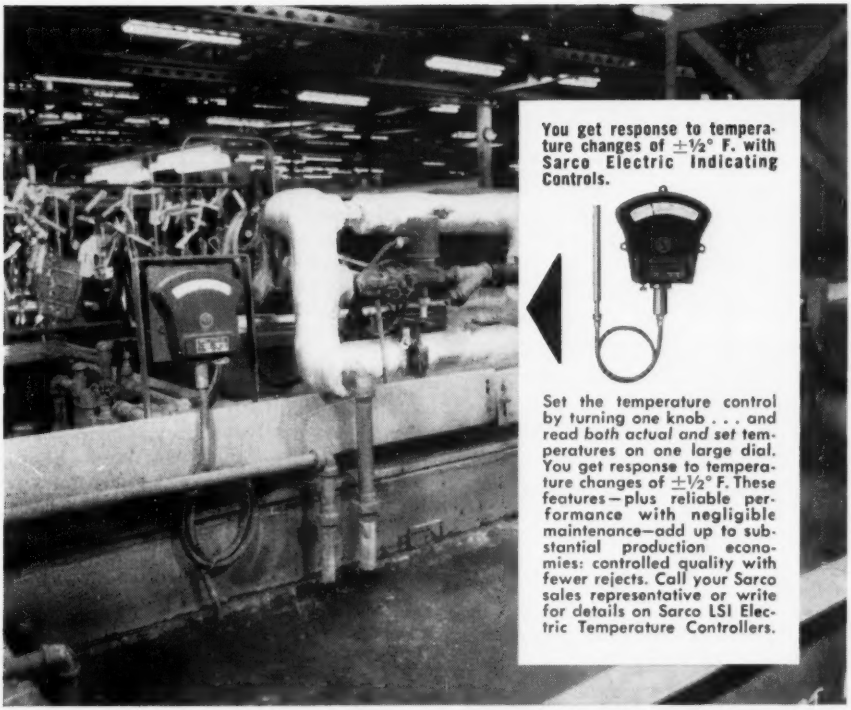
RP® PAINT ARRESTORS

RP | Products of Research — UL Listed

RESEARCH PRODUCTS Corporation

Dept. 38-L, MADISON 1, WISCONSIN

For more data circle 352 on Postpaid Card


You get response to temperature changes of ±½° F. with Sarco Electric Indicating Controls.
Set the temperature control by turning one knob . . . and read *both actual and set* temperatures on one large dial. You get response to temperature changes of ±½° F. These features—plus reliable performance with negligible maintenance—add up to substantial production economies: controlled quality with fewer rejects. Call your Sarco sales representative or write for details on Sarco LSI Electric Temperature Controllers.

At the Stratford, Conn., plant of Sikorsky Aircraft Division of United Aircraft Corporation, the parts finishing department uses Sarco Electric Indicating Regulators to control the temperature of baths for cleaning, anodizing, etching and rinsing of precision helicopter parts.

How Sikorsky controls temperatures in 50 process tanks with Sarco Electric Indicating Regulators

Fifty process tanks are used for parts finishing at the Stratford, Conn., plant of Sikorsky Aircraft—and temperatures in each are controlled accurately and automatically with Sarco Electric Indicating Regulators. In bath temperatures which range from 95° F. to 210° F., Sikorsky easily holds the temperature to close tolerances for rinsing, etching, anodizing and caustic cleaning of precision helicopter parts. Sikorsky reports that maintenance of their Sarco Electric Indicating Regulators is practically zero. 9777F

SARCO
COMPANY, INC.
635 Madison Ave., New York 22, N. Y.

For more data circle 353 on Postpaid Card

Clear and colored coatings produced are corrosion resistant, have excellent resistance to weathering, are color fast. They resist acids, alkalis and solvents.

Hinac coatings are applied in aqueous solution at room temperatures. A low-viscosity solution which covers completely, drips free quickly with virtually no carry over, Hinac can be applied by roller coating, dip or spray. The only pre-treatment required is thorough cleaning and rinsing, as would be done in any finishing system. Curing time can be as little as a few seconds, depending on the heat source.

The Pennsalt coating process is available as Hinac-1, Hinac-2, and Color Hinac. Hinac-1 and 2 are clear coatings, producing a satin finish. Hinac-1 is equal or superior to blackplate in corrosion resistance and can be substituted for organic finishes, Pennsalt says. Carbon steel, stainless steel, aluminum and zinc plated steel coated with this grade can be welded better than untreated metal.

Hinac-2 is a heavier grade, providing protection for ferrous and non-ferrous metals. Aluminum and stainless steel coated with this grade have good resistance to salt spray and have good outdoor weathering properties.

Color Hinac, available in a hard, solvent-resistant grade and a ductile grade, provides both under-film corrosion resistance and attractive, light-fast color. Applied to aluminum, zinc,

HOLLOW CONE
in complete choice of spray patterns and capacities
FLAT SPRAY
CONTROLLED-FLOW*
SPRAY NOZZLES
*exact control of pattern, impact, volume and distribution for any liquid at any pressure.
FULL CONE
for better washing coating and rinsing
for complete information write for catalog NO. 24
SPRAYING SYSTEMS CO.
3229 RANDOLPH STREET • BELLWOOD, ILLINOIS
For more data circle 354 on Postpaid Card

carbon steel, stainless steel, magnesium and other metals, Color Hinac finishes are hard, durable and resistant to salt spray. When exposed to Florida sun for a full year and 2000-hour weatherometer tests, such Hinac coated metals exhibited good weathering, fade resistance and gloss retention. Hinac colors include red, brown, green, blue, black, gray and bronze.

Manufacturer: Metal Processing Department, Pennsalt Chemicals Corporation, 3 Penn Center, Philadelphia 2.

For more data circle 4 on Postpaid Card

★ ★ ★

Butcher Model 500 Portable Filter

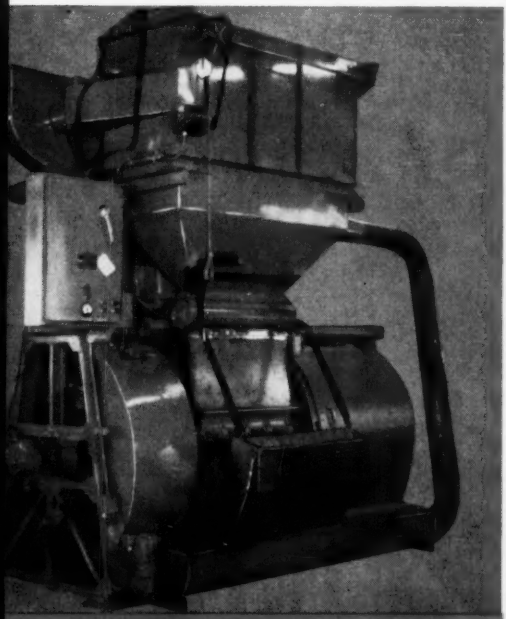
Self-Contained Filter on a Cart

A filter that can be moved where needed with ease has been introduced by L. H. Butcher Co.

The compact unit handles 500 g.p.h. through a filter area of 5½ square feet. A 1/3-h.p. motor powers the unit.

No tools are needed to connect the

(continued)



HARPER BUFFING MACHINE CO.

EAST HAMPTON • CONNECTICUT

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NO BUFFS NO FIXTURES

80% Savings on Labor and Materials by present users — same for short and long runs.

HI-G-Free Grain-ACTION can produce similar savings on over half the jobs now buffed.

FINISH—Equal or superior to Buffing. Intricate detail and complicated shapes preserved.

RANGE — All Metals — Most Plastics; sizes from watch screws to headlamps—

You can finish better for less with the HARPERIZER.

In addition, manufacturers of the finest automatic machines using wheels and fixtures to buff, deburr and polish.

Ask for a Demonstration
Write or Phone (ANdrew 7-2553)

HARPERIZER

Butcher filter. All threaded fittings are hand tightened.

Corrosion-resistant materials of construction are used throughout to withstand corrosive plating solutions.

Manufacturer: L. H. Butcher Co., a subsidiary of The Udylite Corporation, 3628 Olympic Blvd., Los Angeles 23, California.

For more data circle **5** on Postpaid Card

Organic Compound Vaporized to Atomize Paint

A hydrocarbon compound known as Chemsine is heated and vaporized to atomize paint by the Chemtronic Spray Process, recently introduced by John J. Fannon Products Co.

"Chemtronic" paint-application equipment allows the application of coatings with higher solids content, resulting in greater film build with less sag, orange peel and fewer spray passes. Lower atomizing pressures are used, resulting in reduced overspray and bounce-back. Better and more uniform coverage can be realized in recessed areas.

Thin materials can be atomized into finer particles at lower pressures to produce a more uniform coating. High - viscosity paints can be sprayed, giving up to four mils dry film thickness on vertical surfaces, without sagging, in one spray pass. In most cases, paint users can apply materials as received from paint suppliers, without adding thinners.

The Chemtronic Spray Process can be used with practically all types of coatings. "Chemsine" atomizing

(continued)

NEW JUNIOR SIZE VIBRA-WASHER

GIVES YOU AUTOMATIC PROCESSING OF METAL PARTS

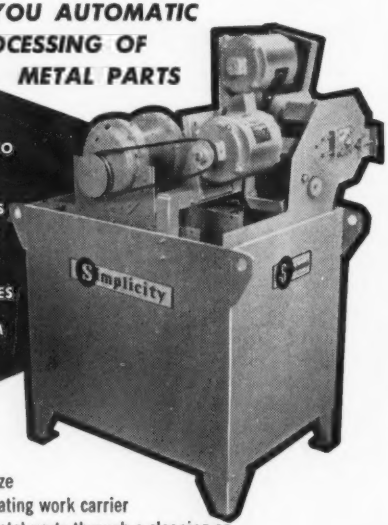
LABOR SAVING

READILY ADAPTABLE TO MANY OPERATIONS

NO NESTING OF PARTS DURING CLEANING OR CONDITIONING CYCLE

ADJUSTABLE CAPACITIES

ELECTRIC—GAS—STEAM HEATING ELEMENTS



The new Simplicity Junior Size Vibra-Washer employs a vibrating work carrier that automatically conveys metal parts through a cleaning or conditioning bath. It cleans so thoroughly that chips, oil and grease are removed from even blind or slotted openings; cleans so gently even the most delicate threads or flanges are not harmed.

If you have a tough cleaning or conditioning job, Simplicity Engineering Company can help. For information, write or call the Industrial Washer Division.

223

Simplicity.

TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND 25, MICH.

FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario

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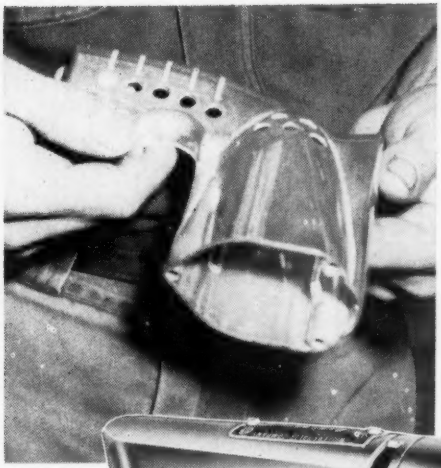


Applying Selling Power to Millers Falls Drills

AHCO Burnishing Compound AL-2

It's good looking, and Hubbard-Hall Planned Service helped make it that way. Millers Falls production people knew that craftsmen like to be proud of their tools — proud of the way they work *and* proud of the way they look. So they talked to their Hubbard-Hall Representative about a bright, uniform, long-lasting finish for their power drills. Back from Hubbard-Hall chemists came Ahco Burnishing Compound AL-2, just the answer Millers Falls was looking for. When the price turned out to be right and the service excellent — we planned it that way — Millers Falls became a regular user of AL-2.

Next time *you* take a long look at your finishing operations — let us look, too. Then we'll submit a detailed recommendation. We'll show you how Hubbard-Hall Planned Service can add "Selling Power" to *your* products. In the meantime, let us send you our latest metal finishing bulletins.

PLANNED SERVICE *for better metal finishing*

THE Hubbard-Hall CHEMICAL COMPANY • Waterbury, Conn.

For more data circle 357 on Postpaid Card

Chemtronic Paint-Application Equipment

agent does not mix with materials when sprayed. Excellent for metallic paints. Excellent with wrinkle and hammer finishes.

Several fluid nozzles, air caps and needles are available for this equipment to cover all industrial-application requirements. Pressure feed, suction feed, gravity flow, and automatic spray guns are available.

Manufacturer: John J. Fannon Products Co., Subsidiary of Hupp Corp., 3000 E. Woodbridge, Detroit 7.

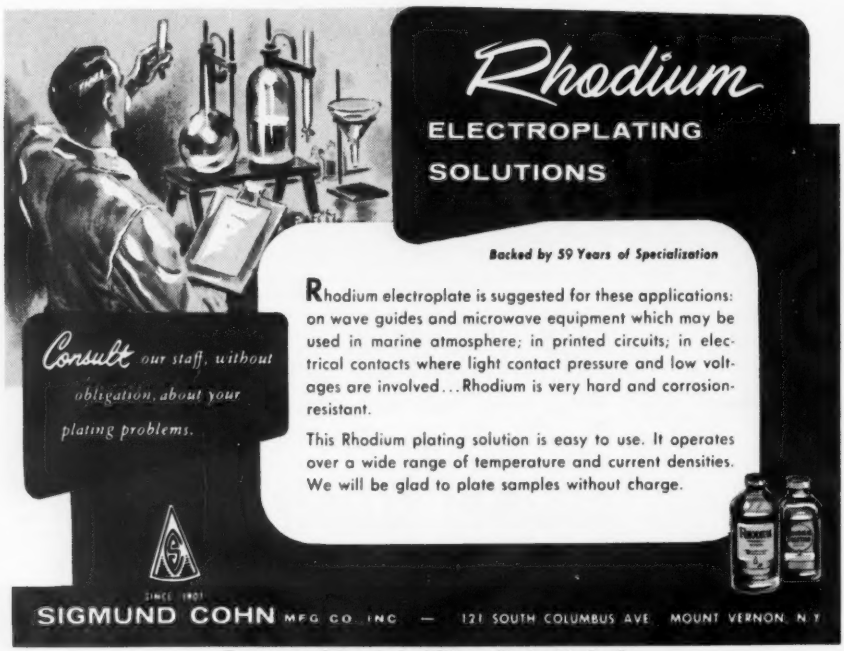
For more data circle **6** on Postpaid Card

★ ★ ★

Electrocleaner for Die Castings

Frederick Gumm Chemical Co. has introduced Clepo 50-ZB, a product for electrocleaning zinc die castings prior to plating. Will not darken or discolor polished castings. Cleans well, pro-

(continued on page 114)


Rhodium
ELECTROPLATING
SOLUTIONS
Backed by 59 Years of Specialization
Consult our staff, without obligation, about your plating problems.
Rhodium electroplate is suggested for these applications: on wave guides and microwave equipment which may be used in marine atmosphere; in printed circuits; in electrical contacts where light contact pressure and low voltages are involved...Rhodium is very hard and corrosion-resistant.
This Rhodium plating solution is easy to use. It operates over a wide range of temperature and current densities. We will be glad to plate samples without charge.
SINCE 1901
SIGMUND COHN MFG. CO. INC. — 121 SOUTH COLUMBUS AVE. MOUNT VERNON, N.Y.

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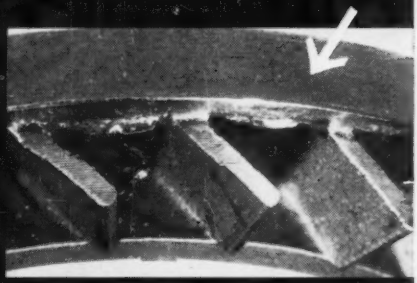
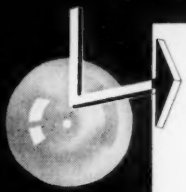
MICROBEADS GLAS-SHOT FOR BLASTING

CAN IMPART THIS MICROFINISH TO THIS SURFACE IN SECONDS



Microbeads Glas-shot are microscopic glass beads for use with all types of wet or dry blast equipment. You can use Microbeads Glas-shot for cleaning, polishing, peening or finishing of all materials normally processed with blast equipment. If you've never used Microbeads Glas-shot you're in for the surprise of your life.

FOR COMPLETE INFORMATION AND SAMPLES . . .
JUST MAIL THE COUPON BELOW



Microscopic Glass Beads for Industrial and Reflective Purposes

MICROBEADS INC.
P.O. BOX 241 • JACKSON, MISSISSIPPI

☐ **Send information and samples**

☐ **Have representative call**

Name _____

Title _____

Firm _____

Street _____

City _____ Zone State _____

BL-359

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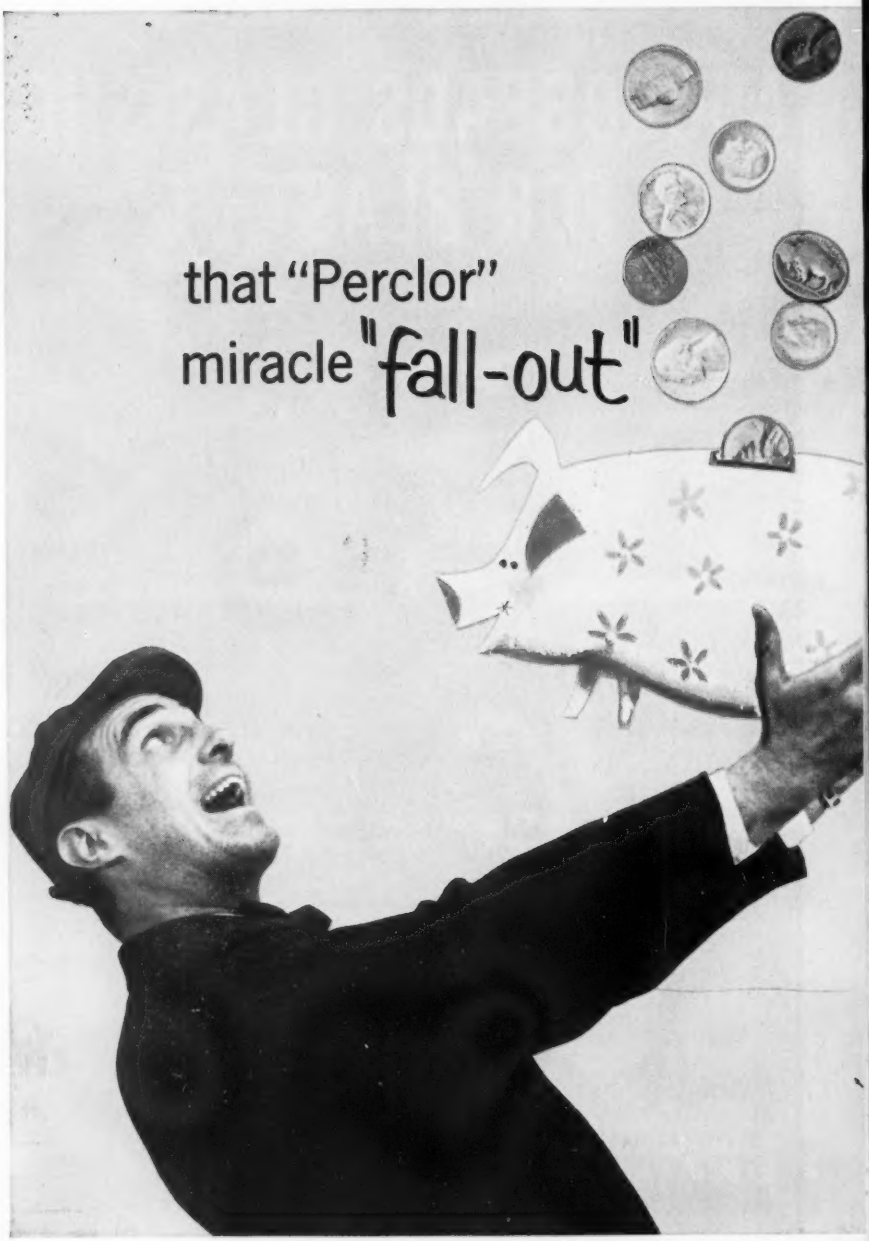
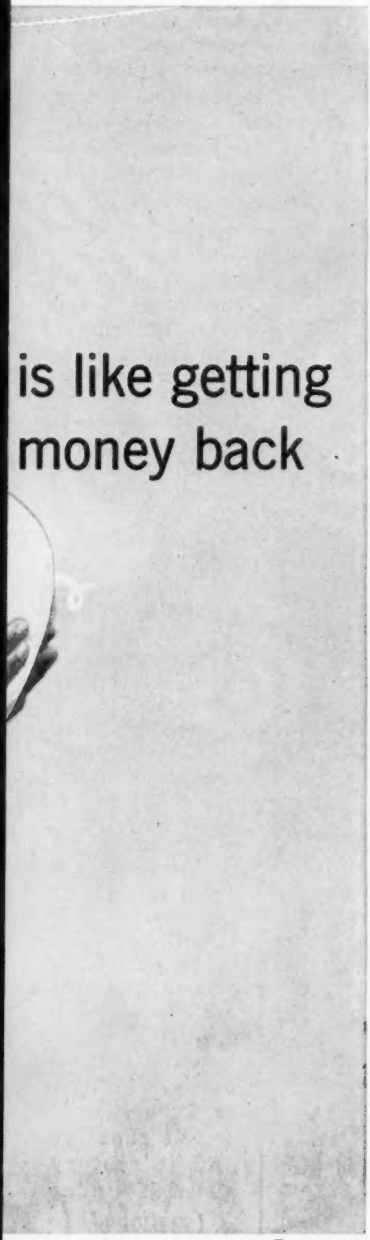

that "Perclor"
miracle "fall-out"



is like getting money back

your degreasing cycle

will be faster, cost less and keep your production line moving without interruption once you start on the Diamond Perchlorethylene "fall-out" method.

Because Perchlorethylene Vapor is 5½ times heavier than air, two things happen. 1. You get more of your solvent back. 2. Stain-free, etch-free parts are warm and dry . . . ready to go on to the next stage right away!

Let Diamond specialists test-clean a sample for you without charge. It will help you determine the degreasing cycle best for your operation. Call your Diamond sales office or write Diamond Alkali Company, Union Commerce Bldg., Cleveland 14, O.

Diamond Chemicals

For more data circle 360 on Postpaid Card

vides surface for excellent adhesion.

Manufacturer: Frederick Gumm Chemical Co., Inc., 538 Forest St., Kearny, N. J.

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★ ★ ★

Electron-Bombardment Vacuum Metallizers Deposit High-Temperature Metals

Electron-bombardment heating sources for use in vacuum metallizing equipment are now available from NRC Equipment Corporation, a subsidiary of National Research Corporation. These units are expected to find use in research work involving ultrapure metals and alloy systems and in depositing high-temperature materials —zirconium, tantalum and tungsten.

According to the company, any of its standard coaters can be supplied with electron-bombardment evaporating sources. However, the most popular units are expected to consist of a standard Model 3144 coater with an electron beam gun or annular ring being used as the heating source.

Evaporation paths can be controlled by the relative position of the gun and of the metal to be evaporated. The latter can be mounted either as an ingot or button on a copper, water-cooled support. The gun can be either on top or on the side of the chamber. It is rated at up to 6 kw. A variety of power supplies are available.

With conventional coaters, it has been difficult or impossible to deposit reactive and refractory materials under

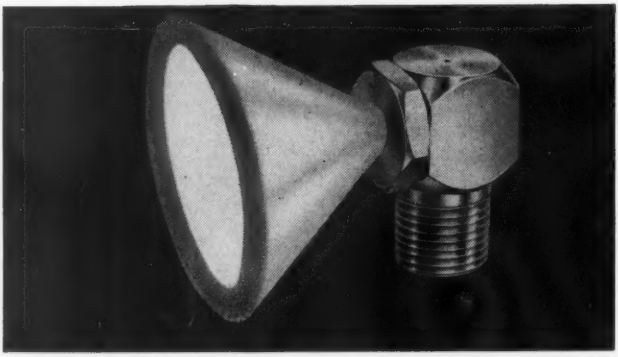
(continued)

METAL FINISHING NOZZLE PROBLEM

To select a nozzle which will efficiently spray phosphate coatings to metal surfaces.

SOLUTION

Delavan Type 2172 WR nozzle



This outstanding nozzle can operate effectively at pressures as low as 5 psi. Made of 316 stainless steel, the 2172 WR offers high resistance to corrosion, assuring longer, more dependable service. There are no vanes, cores or other obstructions to promote clogging.

Whatever metal finishing nozzles you require, there's a Delavan nozzle that does the job best. Write today for Catalog 33A.

DELAVAN Manufacturing Company

WORLD'S LARGEST MANUFACTURER OF NOZZLES • WEST DES MOINES • IOWA

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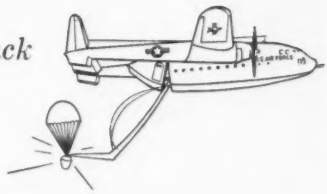
finding the golden needle in the haystack



(Top right) *sketch illustrates mid-air catch of returning Discoverer XIV nose cone snagged by an airplane-towed "skyhook." (left) A captured practice capsule is slowly reeled towards the rear opening of airborne C-119 Recovery Plane.*

NOSE CONES PLATED WITH SEL-REX BRIGHT GOLD* RECOVERED FROM SPACE ORBITS!

Orbiting the globe, then returning earthward upon signal, Discoverer XIV's space capsule plummeted home to be snatched from the heavens in an historic mid-air catch!

U.S. teamwork had plucked the nose cone from a million miles of firmament—marking a significant stride forward in the Free World's space program.

The returning space capsule was plated with Sel-Rex Bright Gold. So was its predecessor, Discoverer XIII, which had been rescued earlier from the Pacific Ocean.

This patented plating process was applied by Philadelphia Rust-Proof Co., Inc. to provide maximum heat reflectivity and emissivity, under sub-contract from General Electric Company, Missile and Space Vehicle Department. Sel-Rex precious metal plating processes, in fact, are included in the original specifications of many advanced Space Age projects.

As producer of the world's largest selection of precious metal processes, Sel-Rex offers unique dependability to users of its plating systems. For, Sel-Rex engineers have removed the guess work, instead assure you of consistent plating quality, the quality that counts in critical areas.

Sel-Rex sales and service technicians throughout the Free World are ready to serve you with unmatched professional precious metal plating services.

Technical literature free on request. Specify precious metal(s) and your application.

(Above) *President Eisenhower holds American flag which was in recovered capsule during its flight through space. Capsule shown was electroplated with patented Sel-Rex Bright Gold Process. With the President are General Thomas D. White, Air Force chief (center) and Col. Charles G. Mathison, who directed the "capsule chase."*

*Patented

Patented processes for plating with Gold, Rhodium, Platinum, Paladium, Silver, and to produce "custom alloys" for your particular requirements.

Sel-Rex®

SEL-REX CORPORATION
NUTLEY 10, NEW JERSEY
World's largest selling precious metal plating processes

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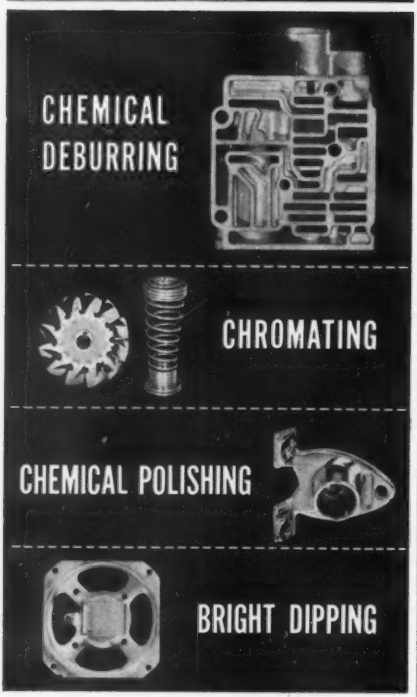
USE Heatbath PRODUCTS FOR



Heatbath has a complete line of tested and proven chemical finishing products for aluminum, magnesium, cadmium, zinc, copper, brass and other non-ferrous metals. This line includes materials for cleaning, etching, deoxidizing, deburring, polishing, bright dipping, chromating and surface protection. Send now for further information.

HEATBATH CORPORATION
SPRINGFIELD 1, MASSACHUSETTS
or 701 North Sangamon Street, Chicago 22, Illinois
38 Years of Service to the Heat Treating and Metal Finishing Industry

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vacuum because of the lack of a practical method of holding and heating them to their vaporization temperatures. With an electron beam source—either a ring or a gun—the top operating temperature is practically unlimited, and the bulk material can serve as its own container.

It is now possible to evaporate almost any material, including those of special interest for electronic research on thin films, for investigation of the bulk properties of high temperature alloys, or simply for coating missile and industrial components with highly corrosion or heat resistant surfaces.

Manufacturer: NRC Equipment Corporation, 160 Charlemont St., Newton 61, Mass.

For more data circle 8 on Postpaid Card

★ ★ ★

Wall-Mounted Chlorinator

A Wall-Mounted Chlorinator has been developed by the Fischer & Porter Company for use in industrial water and waste treatment facilities.

Chlorinator

The 3600 Series Chlorinator has a "Safety Stack" regulator within which all control components are housed. This design reduces frail piping and connections which are potential sources of leaks.

The unit also has a shut-off valve which seals the chlorine supply from the chlorinator during inoperative periods; an isolating valve which seals tight the functional parts of the Safety Stack and prevents water from enter-

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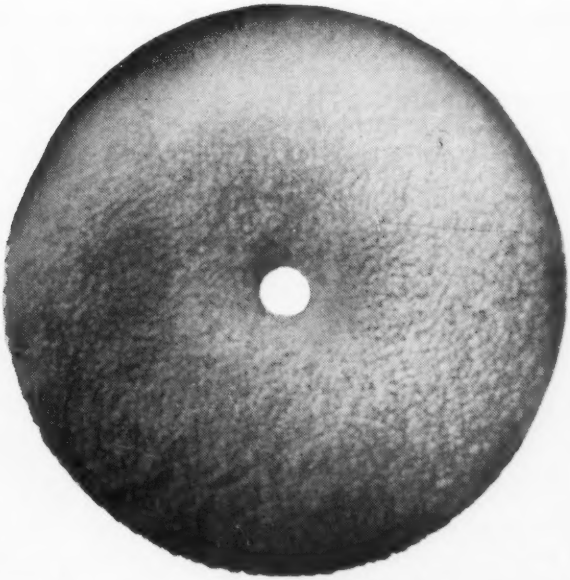

Introducing RAY-BUF

New all-purpose polishing and compounding pad gives higher luster faster

You get results faster and easier when you work with Ray-Buf.

That's because Ray-Buf contains only combed 100% virgin wool yarn. Pile is soft and deep—each tuft 1⅛ inches long.

Ray-Buf holds its shape, for this new design puts all tufts in controlled circles, *perfectly balanced* for longer use. Completely flexible, so you get fast, easy polishing on hard-to-reach surfaces.

SELECTED FIRST-QUALITY YARNS make Ray-Buf soft and fluffy, give it added resilience and longer life.

WASHABLE. Ray-Buf tufts are firmly anchored to a strong canvas backing. They will not pull out, even after repeated washings.

Mail coupon today for descriptive bulletin and complete details on the new *money-saving* Ray-Bufs.

Schlegel
MANUFACTURING COMPANY
P. O. Box 197, Rochester 1, N. Y.
In Canada: Oakville, Ontario

Send complete information on RAY-BUF, new all-purpose polishing pads.

Name.....

Street.....

City.....Zone.....State.....

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ing the chlorinator due to ejector back pressure; and a differential pressure regulator to maintain stable chlorine gas feed despite wide variations in gas pressure, water supply pressure, or pressure at the point of application.

This manually-operated chlorinator can maintain an accuracy of plus or minus 2 per cent of feed rate over a 20-to-1 range in flow. A simple snap-in flowmeter tube allows capacity changes from 3 to 200 pounds of chlorine gas per day, without the use of tools.

Manufacturer: Fischer & Porter Co., 670 Jacksonville Rd., Warminster, Pa.

For more data circle **9** on Postpaid Card

★ ★ ★

Chemical Coating Offers Longer Life For Aluminum Siding

Pittsburgh Plate Glass Company has developed a one-coat baked enamel with "superior chemical properties that afford longer life than any other single-coat organic baked film designed for application to aluminum siding."

The coating is based on Duracron thermosetting acrylic resins. It offers protection against chipping, cracking, flaking, peeling or blistering.

Extensive field tests show that the aluminum coating endures for years in corrosive salt air and industrial fumes, thereby offering homeowners substantial savings on paint maintenance. Under normal conditions the hard, smooth aluminum siding finish, which has remarkable resistance to dirt pick-up, can be main-

Now! REMOVE
hard-to-clean
PIGMENTED
DRAWING
COMPOUNDS
FAST!
leaves no lime deposits
keeps lines and nozzles clean
rinses completely
WITH
DuBois Chemicals
HIS
422
INDUSTRIAL SPRAY WASHER COMPOUND DELUXE
Probably the most effective cleaner for use in spray washing machines. Safe on soft metals as well as steel. Emulsifies grease and oil completely. Contains special rust inhibitor. Requires no special handling. Harmless to workers' skin.
DuBois formulates many cleaning compounds for the metal working industry. Get the facts from your nearby DuBois' Mr. Du, listed in Yellow Pages under "Cleaning Compounds".
DuBois Chemicals, Inc. • Broadway at 7th • Cincinnati 2, Ohio

For more data circle 365 on Postpaid Card

tained simply by hosing down the surface periodically.

The company said that its Duracron finish combines in a single coating exceptional qualities of adhesion, flexibility, chemical resistance, durability, color retention, ease and uniformity of application. The specially prepared low- gloss thermosetting acrylic resin finish is chemically designed to protect aluminum-clad homes and maintain their beauty for years despite exposure to intensive sunlight, high humidity, coastal salt-damp, or industrial and chemical fumes.

The thermosetting acrylic resin coating is available in a complete range of colors and at a cost comparable to other coatings

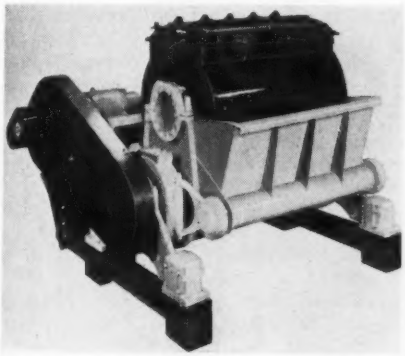
Manufacturer: Pittsburgh Plate Glass Co., Industrial Finishes Div., 1 Gateway Center, Pittsburgh, Pa.

For more data circle **10** on Postpaid Card

Redesigned Vibratory Finishers

Productive Equipment Corporation has introduced a line of vibratory finishers which deburr, descale, burnish and color virtually every size and shape of part without marring or distortion. The redesigned units are

(continued)



Selectro Vibro-Finisher: shorter cycles

SPRA-CON

COMPLETE FINISHING SYSTEMS

POWER SPRAY WASHERS
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AIR REPLACEMENT SYSTEMS
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especially recommended for finishing inside surfaces and hard-to-get-at areas, the manufacturer reports.

Called Selectro Vibro-Finishers, these machines have drums which are interchangeable and are available in various sizes; drums with several compartments are available for use in shops that have many different lots of parts which require different media and finishing times.

The vibrating mechanism on these units is a positive eccentric with adjustable stroke.

Shorter cycles and fewer nicked and scratched parts are other features of these machines, the manufacturer reports.

Manufacturer: Productive Equipment Corp., 2926 W. Lake St., Chicago 12, Illinois.

For more data circle 11 on Postpaid Card

Finned Plastic Plating Barrel

An all-plastic plating barrel recently introduced by Imperial Industries, Inc., is said to increase speed of deposition.

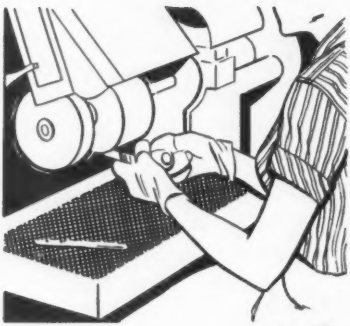
Imperial Plating Barrel

The fins on the outside of this barrel are designed to improve agitation of the plating bath and to speed circulation of the plating solution within the barrel. Design and construction of the barrel are also said to reduce electrical resistance.

Imperial makes the oblique barrel

(continued)

PROTECT FINE PLATED SURFACES



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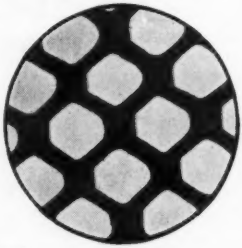
Neotex . . . the open pattern Neoprene rubber matting, protects highly polished finishes when used to line any surface where goods are worked on or in transit. In roll form, Neotex can be easily cut to any size or shape . . . it's rugged and long lasting, resistant to abrasives, caustics, heat, acids, oils, oxidation. Open pattern permits buffing compounds to settle. Available in a fine or coarse pattern. Write for complete information.



RP *Neotex*®

RESEARCH PRODUCTS CORPORATION

Dept. 76-L, Madison 1, Wis.

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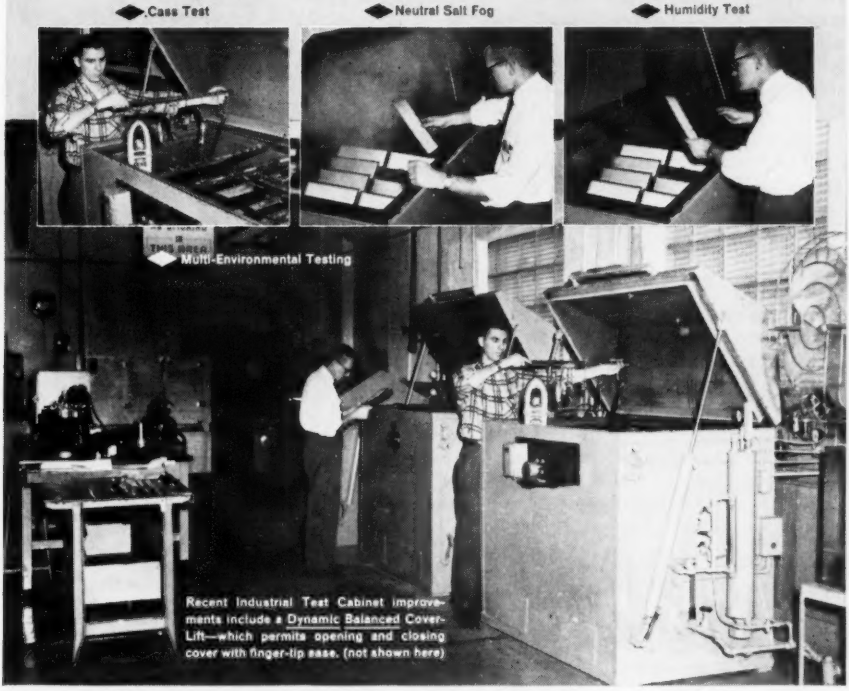
American Motors Fights Corrosion with INDUSTRIAL Test Cabinets


Cass Test
Neutral Salt Fog
Humidity Test
Multi-Environmental Testing
Recent Industrial Test Cabinet improvements include a Dynamic Balanced Cover-Lift—which permits opening and closing cover with finger-tip ease. (not shown here)

Rigid accelerated corrosion tests show reliability of Type 411 Cabinets

Corrosion resistance comes under conscientious control at American Motors. Typical of their emphasis on serviceability and long life for the RAMBLER product is their attention to the environmental testing of plated and painted parts.

Among recent test equipment additions to their production test facility at Kenosha, Wisconsin, were three of our new Type 411 Corrosion Test Cabinets. Particularly suitable for this auto manufacturer's needs, Type 411 is versatile enough to meet all the essential requirements for neutral salt fog, humidity and "Cass" corrosion tests.

The vulcanized, rubber-lined cabinet is of double wall construction to provide uniform temperature within the test area. All saturation and heating processes are under positive control. Relative humidities of 95 to 100% from ambient temperatures to 125° are routine.

Close cooperation with government and the military; ASTM, AES, and conformity to most federal and commercial requirements, specifications and procedures have placed the new INDUSTRIAL Type 411 Test Cabinets in demand *wherever* environmental simulation and accelerated corrosion tests serve improved quality control standards.

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CP-140-R

INDUSTRIAL

INDUSTRIAL FILTER & PUMP MFG. CO.

5904 Ogden Ave., Cicero, Illinois

PRESSURE FILTERS ♦ ION EXCHANGERS ♦ CORROSION TEST CABINETS ♦ PUMPS ♦ WATER & WASTE-TREATING EQUIPMENT

For more data circle 368 on Postpaid Card

in polypropylene. The firm also makes the barrel in Copolefin, a special olefin copolymer. The barrels stand up under all solutions and temperatures normally encountered in the plating process.

They are also available in high-temperature acrylic (Plexiglas) and other materials, on special order.

Manufacturer: Imperial Industries, Inc., 4436 Walker Ave., Wayne, Mich.

For more data circle **12** on Postpaid Card

★ ★ ★

New Sizes in Rubber Gloves

New sizes for two models in the Stanzoil Industrial glove line have been introduced by The Pioneer Rubber Co.

The additions, sizes 10 and 11, are in N-31 and N-35 Stanzoil styles.

Essential features of the gloves have not been changed. Made of DuPont neoprene, the N-31 and N-35's are milled to withstand oils, greases, sol-

(continued)

Pioneer Rubber's Stanzoil Gloves: new sizes

Electro **NON-FLAMMABLE**

NO CURRENT
NO HEAT **Cold Stripper**

Save TIME and MONEY and EFFORT

Enamels, even *high bake*, vinyls, epons, hammers, wrinkles, alkyd paints, primers —in fact—every known hard to remove finish yields to ELECTRO COLD STRIPPER in quick time—often seconds. Eliminate the problem of paint build-up on conveyor baskets, carrying racks, hooks, etc., with an ELECTRO COLD STRIPPER in-line or batch set-up.

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For more data on advertisement on opposite page, circle 370 on Postpaid Card

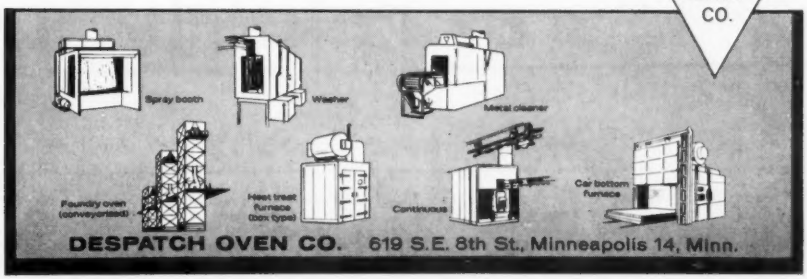
DESPATCH PRECISION AIDS 350% BOOST IN PLYWOOD OUTPUT

Quality control possible with Despatch ovens has enabled a nationally-known manufacturer of plywood panels to increase production 350% in only four years.

Plywall Products Company of Ft. Wayne, Ind., and Corona, Calif., uses Despatch ovens for two separate, critical steps in manufacture of its quality Poly-Clad Philippine mahogany plywood panels. Result has been panels of such beauty and durability sales have soared.

Despatch engineers can provide you with equipment that will brighten your sales and production picture too. Let us prove it. Send *today*! for free bulletin 100DG.

DESPATCH OVEN CO.



DESPATCH—INDUSTRY LEADERS FOR 58 YEARS

vents, acids and caustics. This milling process also improves tensile strength and tear resistance. The non-slip finish on the palm and finger areas enables the wearer to grip wet, slippery objects securely.

Manufacturer: The Pioneer Rubber Co., 296 Tiffin Rd., Willard, Ohio.

For more data circle **13** on Postpaid Card

★ ★ ★

Push-Button Feed System for Solid Aluminum Etchant

A large drum of solid aluminum etchant and a simplified technique for push-button feed to etching tanks have been introduced by Pennsalt Chemicals Corporation. The 600-pound drum of AE-16S is for use in large aluminum etching operations.

The continuous-feed system is uncomplicated. It requires only a pump, standard piping and an ordinary shower head. The user can control accurately the amount of etchant being added to the tank. Flow of etchant can be turned on and off as work loads require.

The 600-pound drum of AE-16S supported by a rack or cradle is positioned with its 5-inch friction lid open over the edge of the etching tank. Etchant solution is pumped from the tank through the shower head which directs the spray solution directly on the etchant, dissolving it at a uniform rate. The concentrated etchant then flows by gravity into the tank through holes punched in the lowest part of the drum head. A 600-pound drum of AE-16S can be dissolved and added to the etching tank in 1 to 1½ hours.

This technique for handling large drums of etchant offers additional

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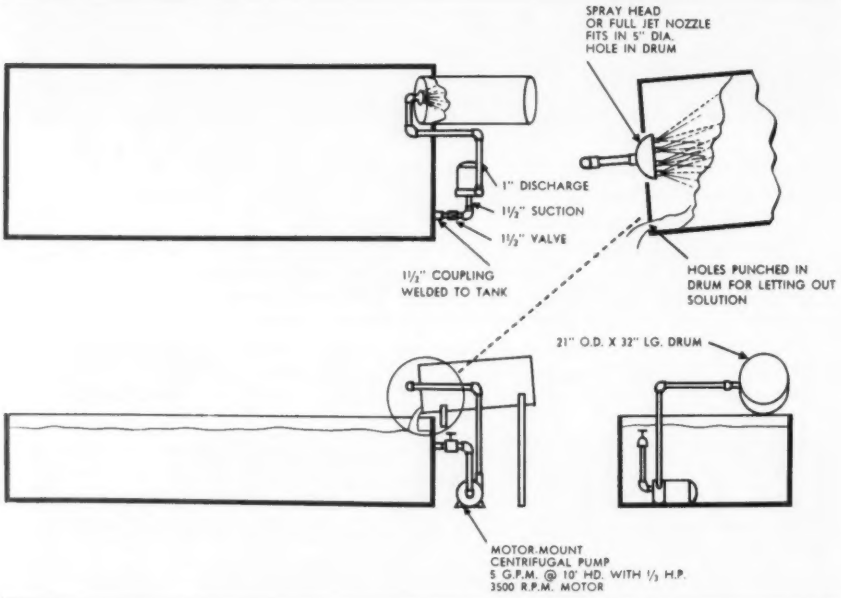


Diagram of push-button feeding system for supplying aluminum etchant to etching tanks.

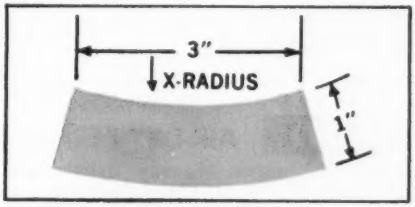
CURVED ANODES

for plating cylinders faster and more uniformly

To make anode surfaces parallel the rotogravure cylinder being plated, and to fit the curve of the current-carrying slings, Anaconda "Plus-4" phosphorized copper anodes are now extruded to precisely curved shapes. This design offers possible cost savings and improved cylinder quality.

It is reported that very uniform deposits are obtained from these specially shaped anodes, thus helping to cut finishing costs. The solution of the anode is also more uniform, thereby reducing the scrap.

For more information, write: Anaconda American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 60108



NO EXTRA DIE COST—Simply specify inside radius of anode.

"PLUS-4"® PHOSPHORIZED COPPER ANODES

ANACONDA®

Anaconda American Brass Company

For more data circle 371 on Postpaid Card

savings, uniform concentration increase, and requires little manual contact. It ends uncertainties of manual measuring and blending. Anti-scaling and sequestering agents in the compound are always in the right proportions so there is little danger of over-measurements.

Manufacturer: Metal Processing Dept., Pennsalt Chemicals Corp., 3 Penn Center, Philadelphia 2, Pa.
For more data circle **14** on Postpaid Card

★ ★ ★

Commercial Gold-Recovery Unit

The first commercial unit for recovering gold lost in electroplating has been introduced by Technic, Inc.

Until now between 4 and 10 per cent of all gold used in electroplating has simply gone down the drain, Technic reports, and the loss to the plating industry is millions of dollars a year.

The resin Gold Saver recovers enough gold in a short time to pay for itself.

The Gold Saver is designed to become part of the gold plating process. Basically, the unit consists of a column of resin particles, which captures gold in solution that now is being lost; a pump for circulating through the resin column the water in which the gold is dissolved; and pipes, hoses, and connections between the pump and the special resin column.

The unit operates as follows:

After an item is plated with gold,

(continued)

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PC-7 **AIR-DRY COATING . . .**
The standard of the plating industry for 15 years. Requires no primer, no baking. Ideal for racks, fans, exhaust systems, patching plastisol coatings, tank patching, and other difficult areas and equipment requiring corrosion protection.

PC-21 **PLASTISOL GENERAL PURPOSE COATING . . .**
The ultimate bake-on Vinyl coating for permanent protection of racks, tanks, pipe and equipment. Provides coating thickness to 3/16" with one application, and is immune to effects of all plating chemicals.

SO-8 **STOP-OFF LACQUER . . .**
Won't creep when applied, won't allow underplating, strips like magic. How much easier can selective plating be made?

V-10 **AIR-DRY PERMANENT COATING**
Another unique Munray development of a modified Vinyl formulation to allow easily applied protection to large surfaces, such as complete walls, large processing equipment, hoods, and ducts, tank exteriors.

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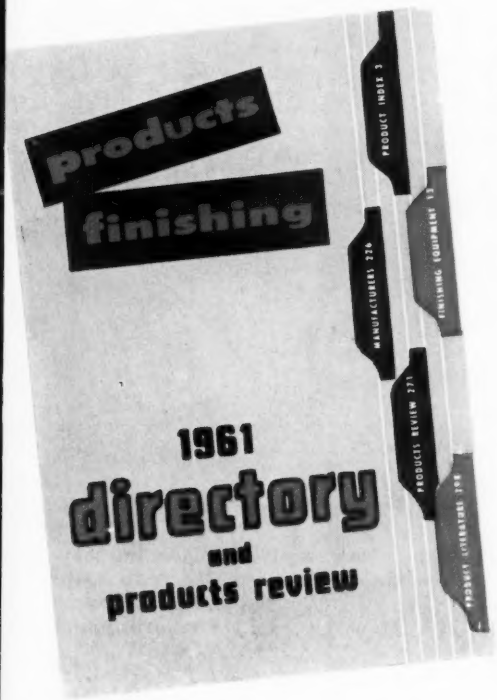

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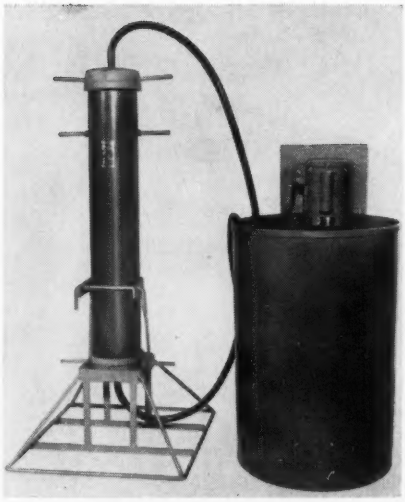
it is immediately immersed in a tank of water to rinse off and save the plating solution, which frequently costs between $40 and $50 a gallon. (this rinse tank is called a "drag-out" tank).

Over a period of time, the concentration of gold solution in the drag-out tank builds up until, because of its gold content, it is worth possibly $10 a gallon. Periodically, contents of this tank are added to the gold plating tank to keep the plating solution at a workable level and to recover some of the gold.

In the past, the plated item was then rinsed in running water, and the gold on the item coming from the drag-out tank was lost.

The Gold Saver comes before this running-water rinse. It is attached to a tank into which the plated item is dipped, after the drag-out tank. The pump continuously circulates the solution through the special resin trap, where the gold is picked up. The work, free of gold, is then rinsed in running water.



Gold Saver: recovers gold from rinse water

When the resin is completely saturated with gold it may be burned by the plater to recover the gold, sent to a refiner, who would also recover the gold by burning, or it may be returned to the Technic laboratories for reclaiming.

The Gold Saver is designed for use with any acid or non-free cyanide golds.

Manufacturer: Technic, Inc., P.O. Box 965, Providence, R. I.

For more data circle **15** on Postpaid Card

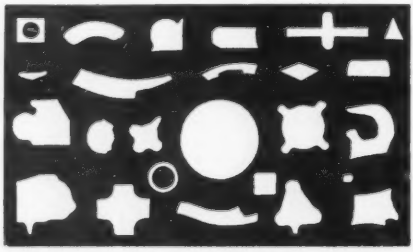
★ ★ ★

"Spotless" Dryer for Wet Parts

Drying metal parts after electroplating, bright pickling and phosphatizing without leaving water residue stains has long been a problem to metal finishers. The "Trisec" process is said to solve this problem.

A special drying solvent, "Trisec",

(continued)



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Die-cut to close tolerances. Self-sticking — go on *fast*. Protect from finishing to inspection. Hundreds of stock shapes and sizes. Specials to order.

Narrow-Slit FINE LINE Masking Tapes — Precision slit from 1/64" to 1/4" (± .005"). 30 yd. rolls.

FREE Samples and Literature . . . Write:

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Not just an access door. Half the entire cone comes off.

Speed up inspection . . . slash maintenance and downtime costs.

This removable cone design is an exclusive feature found only on DeBothezat Bifurcator Fans.

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New design duct fan

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American Machine and Metals, Inc.
East Moline, Illinois

Gentlemen: Your new Removable Cone feature for DeBothezat Bifurcator Fans looks good to me. Please rush descriptive literature at once.

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Phillips Dryer: for spotless parts

containing trichlorethylene, is used in specially designed equipment that outwardly resembles a liquid-liquid-vapor degreasing machine.

The process is suitable for practically any article unaffected by trichlorethylene, including glass, ceramics and metals. It can be used for intricately shaped parts with cracks and crevices as well as stampings, extrusions, castings, tubes, wire and strip.

"Trisec" is useful for drying after electroplating, phosphatizing, chromating, electropolishing, contour etching, acid pickling, bright dipping and derusting.

The patented process was developed by Imperial Chemical Industries, Ltd. Phillips Manufacturing Co. has been granted a license for the process and distribution rights for "Trisec" in the United States.

Manufacturer: Phillips Manufacturing Co., Inc., 3475 W. Touhy Ave., Chicago 45, Ill.

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Fast, low cost finish for aluminum, copper and alloys, steel and stainless steel. Ideal for decorative finishes, burr removal, electroplate adhesion and size control. Standard and custom concentrates nationally available in any quantity.

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Let us convince you—send samples for processing.

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Electro-Glo

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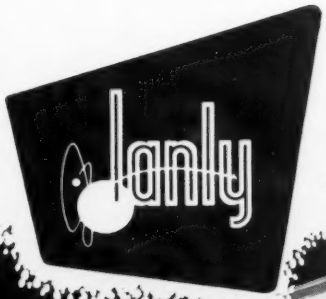

Convection Oven handles the finish drying of Waterheaters

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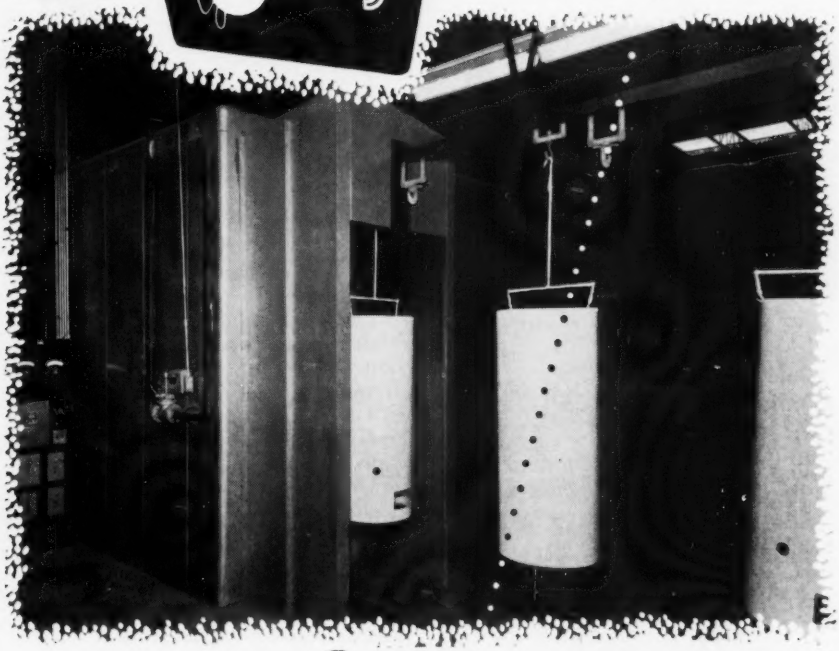

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– – – The end result being an efficient, economical installation functioning to your complete satisfaction.

Procedures such as this are an old story with LANLY.

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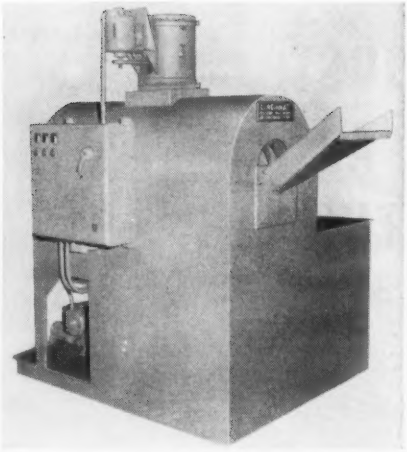
Pittsburgh, Pa. • Rochester, N. Y. • San Francisco, Calif • St. Louis, Mo

For more data circle 376 on Postpaid Card

Compact Cleaning Machine for Small Parts

Just 5 feet long and 4½ feet wide, a drum-type cleaning machine designed for volume cleaning of small parts has been introduced by Cincinnati Cleaning & Finishing Machinery Co. Suitable for stampings, castings and machined parts, the machine has a variable-speed drive which provides capacity ranging from 6 to 9 cubic feet of parts per hour.

Parts are loaded into the machine manually from shop containers or direct from a conveyor discharging into the loading hopper. The parts are conveyed through the machine by a worm inside the drum, passing through a soak section, a spray section and finally a drain section before being automatically discharged. Time in the various sections is controlled by the variable-speed drive.



Drum-Type Cleaning Machine for Small Parts

The machine is completely self-contained, incorporating cleaning solution pump and motor, variable-speed drive and motor, ventilating blower and motor, solution temperature controls and solution tanks with access door to solution-filtering screens.

Manufacturer: Cincinnati Cleaning & Finishing Machinery Co., 2008 Hageman St., Cincinnati 41, Ohio.

For more data circle **17** on Postpaid Card

★ ★ ★

Nickel Process Produces Satin Finish Plate Directly from the Bath

The Udylite Corporation recently unveiled a nickel plating process that produces a satin finish directly from the plating bath.

Designated "Satylite," the process produces smooth, non-reflecting nickel plate without additional hand polishing or buffing.

Clyde H. Reeme, president of The Udylite Corporation, said the process

(continued)

FUNCTIONAL FINISHES!!

If you require your coatings to accomplish some specific task — something beyond mere ornamental appearance or average longevity—

Try Us!

We make ACRYLIC, ALKYD, CELLULOSIC and VINYLOID coatings for a very wide range of specialized industrial applications.

The Varnish Products Co.

5204 Harvard Avenue
Cleveland, Ohio

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SPEEDS THE **UNDERWOOD** WORLD'S BUSINESS

discovers KENVERT® 17A

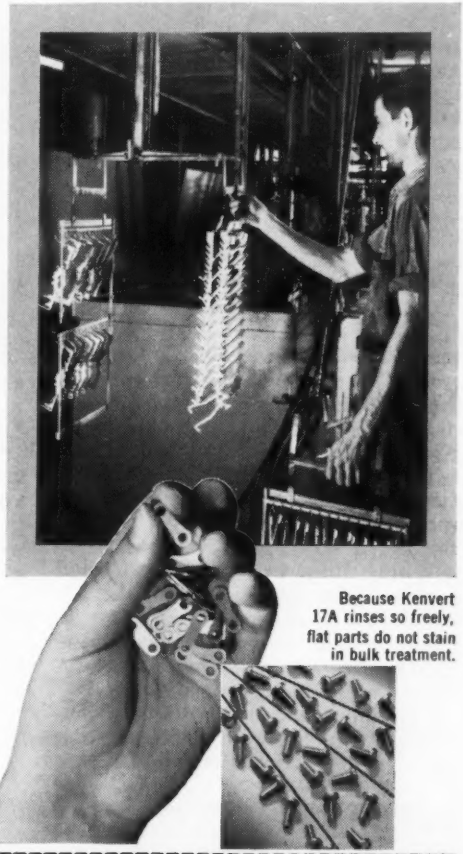
A bright new star has appeared in the chemical conversion coatings field. The Conversion Chemical Corporation has made tremendous strides in the development of new coatings that achieve maximum corrosion protection and brightness.

Underwood made their own bright dip for many years to insure high quality standards and substantial savings over products commercially available to them. Twenty-four hour salt spray corrosion protection as well as bright appearance is required by Underwood Laboratories for this application.

It came to the attention of Underwood Engineers that a product called Kenvert® 17A was reputed to show savings that were almost unbelievable while maintaining necessary high quality standards. Kenvert® 17A was evaluated in the laboratory, approved, and placed in production. Savings over Underwood's solution are now 68½%.

On bulk work, chrome appearance, together with excellent corrosion protection has allowed Underwood to switch screw products from expensive nickel and chrome to zinc and Kenvert® 17A — the process of racking which was formerly required for many of these parts has been eliminated.

Due to the fact that the Conversion Chemical Corporation product line is complete in the chromating field, it has been able to satisfy many Underwood requirements in other applications such as: Kenvert® 32 for non-spotting or staining of brass hardware for carrying cases and Kenvert® 40 which is now used to replace anodizing with equivalent corrosion protection at substantial savings.



Because Kenvert 17A rinses so freely, flat parts do not stain in bulk treatment.

CONVERSION CHEMICAL CORPORATION

99 East Main St., Rockville, Connecticut
Phone: TRemont 5-3357
Licensees: Nicromatic Ltd., Toronto, Canada
Silvercrown Ltd., London E. C. 1, England

For more data circle 378 on Postpaid Card

will augment rather than replace the existing plating processes now used by industry.

"We believe the Satylite process will promote a wider designation of plated finishes by stylists in many fields of industry," Mr. Reeme said. "Potential applications include metal furniture, automotive trim and hardware (both interior and exterior), camera components, costume jewelry, drawer pulls, hinges and other items of builders' hardware, marine hardware, surgical instruments, plumbing goods and household appliances."

An advantage of the Satylite process is the ease with which a two-tone effect may be obtained. Buffing raised, accessible surfaces to a high luster creates an attractive contrast between the bright buffed surface and the surrounding satin finish produced in the plating bath.

The application of Satylite to basis metals that have been polished in varying degrees produces a wide variety of scratch-brush effects. The polishing lines are partially leveled and visible in the final finish. An advantage of producing a scratch brush finish by this method is that all the nickel plate applied remains to protect the item against corrosion.

The appearance of the Satylite finish is preserved and enhanced by the addition of a chromium plate. Flash coatings of other decorative metals, such as copper, brass and bronze may be substituted to produce satin or contrasting finishes of these metals.

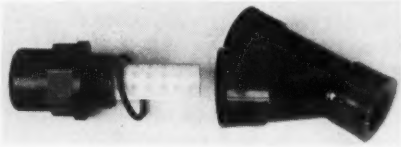
Manufacturer: Udylite Corporation, Detroit 11, Mich.

For more data circle **18** on Postpaid Card

★ ★ ★

Polypropylene Pipe-Line Strainers Are Lightweight, Resist Corrosives

Polypropylene Pipe-Line Strainers are designed to trap particles which would be injurious to the internal moving parts of process equipment. The



Vanton's Polypropylene Pipe-Line Strainer

light weight, high strength and chemical resistance of these strainers makes them ideal for applications involving solvents, greases, oils and the majority of common acids at temperatures up to 185 deg. F. The strainer element can be easily removed for cleaning or replacement. Available in sizes ½ through 2 inches with molded thread or socket-weld ends.

Manufacturer: Vanton Pump & Equipment Corporation, Hillside, N. J.

For more data circle **19** on Postpaid Card

FAST STRIPPERS *(For Metal Parts)*

Enamels • Lacquers • Primers • Vinyls • Synthetics

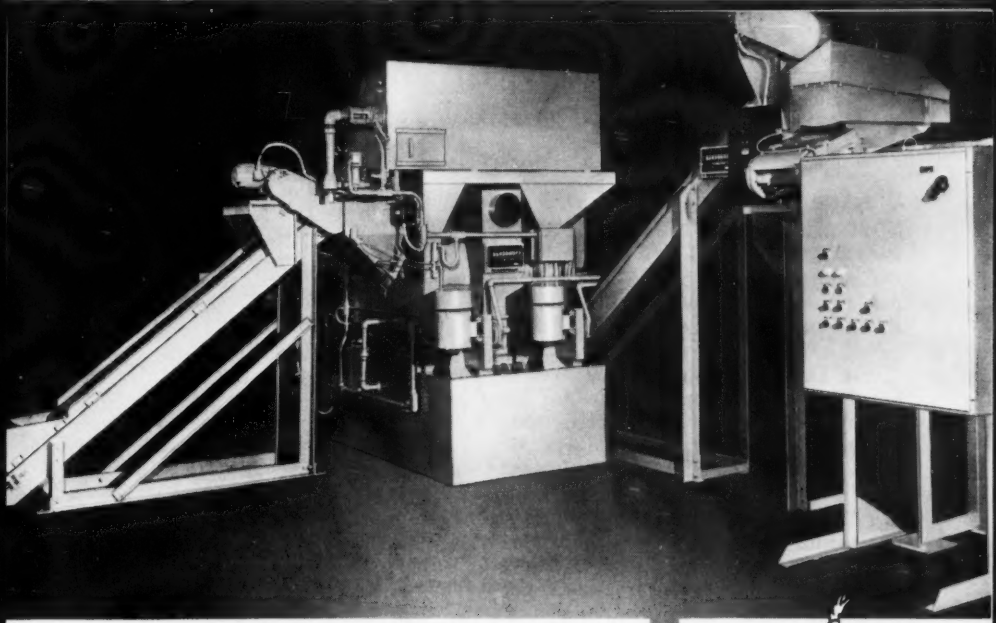
LEA SYNSTRIP...a fast working, non-corroding liquid, enamel, lacquer and synthetic coating stripper. Will not attack aluminum, zinc or any other base metal or alloy; does not dissolve the coating but breaks the bond. When heated to temperatures of 160° to 200° F., stripping synthetic coatings of the alkyd, epoxy, phenolic, silicone and urea type, is accomplished in a matter of seconds.

LEA COLDSTRIP...high speed stripper used at room temperature; only minimum ventilation; can be filtered for continued use.

Send details on your stripping problem and we will recommend a stripper for you to test.

The LEA Manufacturing Co.
16 Cherry Avenue, Waterbury 20, Conn.

For more data circle 379 on Postpaid Card



New **RANSOMATIC**

washes, deburrs, rinses, and dries 4,100 stampings an hour... automatically!

Saves floor space...handling... and man hours

The stainless steel stampings processed in this Ransomatic were formerly cleaned in a vapor degreaser, and trucked to tumbling barrels for dry deburring. Dust left on the parts frequently jammed the feeder of the machine which automatically assembled the finished appliance.

Now, lost motion and trucking is eliminated. Work is received directly from the presses. The entire cleaning operation is automatic. Equally important, product quality is much improved and inventory control is easier.

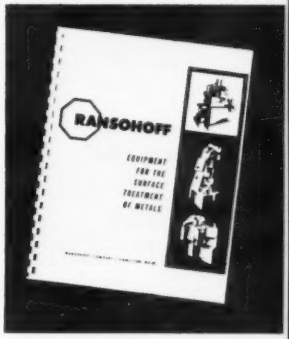
If you have a finishing problem, write or phone us. You'll find we speak your language.

RANSOHOFF/ROTO-FINISH

20 North Fifth Street, Hamilton, Ohio Phone: TWinbrook 3-5813

For more data circle 380 on Postpaid Card

Write for completely indexed 36 page catalog on Ransohoff equipment for the surface treatment of metals.



Diamond Alkali To Market Duramir Chromium Plating Process

General Development Corporation has announced that its Duramir chrome plating processes will be marketed by Diamond Alkali Company.

The Duramir processes are three in number. One of them provides for the direct plating of chromium onto aluminum or aluminum alloys by "novel and simplified techniques." The second process provides for plating of a brighter, more durable chromium onto a wide variety of base metals after application of a bright nickel plate. The third process, which is adaptable to newly developed plating systems, produces a corrosion-resistant, crack - free, mirror - bright chromium plate on aluminum as well as the other normal base metals. Patents are pending.

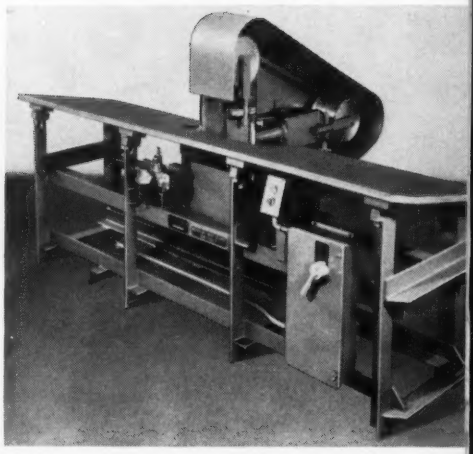
Information: Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio and General Development Corp., 2828 Coral Way, Miami, Fla.

For more data circle **20** on Postpaid Card

★ ★ ★

Abrasive Belt Head with Resilient Driven Back-Up Belt

Murray-Way Corporation has introduced a polishing machine with an abrasive belt which travels on a resilient, driven back-up belt that's supported at work position by a steel platen. The back-up belt, constructed of rubber and fabric, saves wear-and-tear on the abrasive belt by (1) providing resilience for the cutting grain, and (2) giving it a moving support as it crosses the steel platen at work position.



Polishing machine with resilient, driven back-up belt. Safety hood cover has been removed. The large table-top may be used horizontally, or tilted to produce a chamfer or beveled edge on the work. In addition, it may be positioned so as to provide angular surface in relation to second surface.

Manufacturer: Murray-Way Corporation, P. O. Box 180, Birmingham, Michigan.

For more data circle **21** on Postpaid Card

RONA T.M.

Synthetic Pearl Essence with the natural look!

PEARLESCENT FINISHES BAKE OR AIR DRY FOR

Your Product Made of Metal, Plastic, Wood or Glass.
Write for sample. Specify application and choice of vehicle.

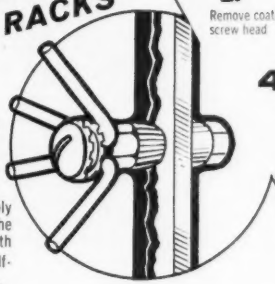
RONA PEARL AROUND THE WORLD

RONA PEARL CORPORATION
A Division of Rona Laboratories, Inc.
East 21st and East 22nd Sts., Bayonne 4, N. J.
Plants: Main • New Jersey • Canada

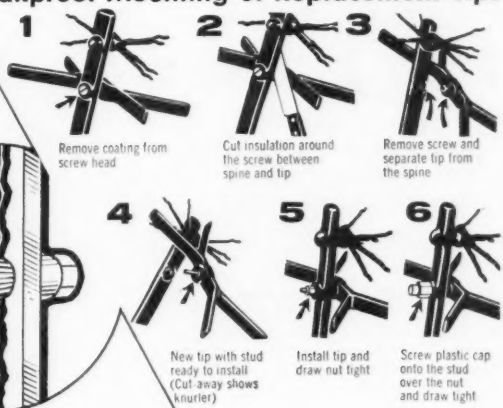
For more data circle 381 on Postpaid Card

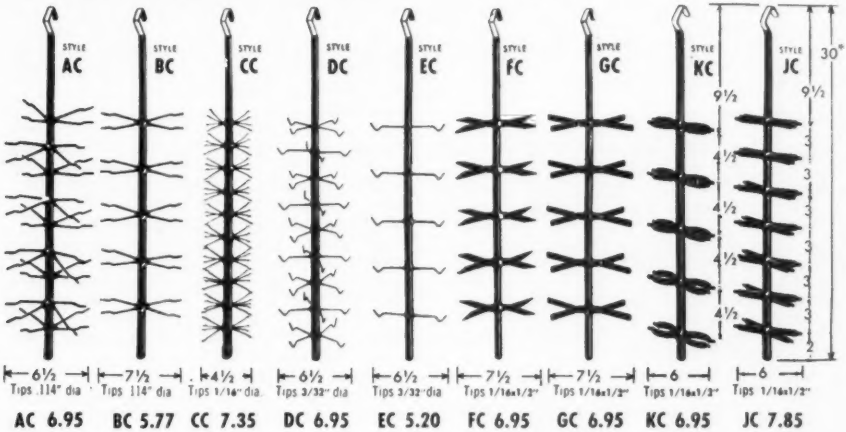
New MASS-PRODUCED Convertible PLATING RACKS with Replaceable Bolt-On Tips

This **new** bolted tip assembly makes it easy to remove the original tips and replace with THINKER BOY pre-coated self-sealing tips as shown at right.



Leakproof Mounting of Replacement Tips


1
2
3
4
5
6
Remove coating from screw head
Cut insulation around the screw between spine and tip
Remove screw and separate tip from the spine
New tip with stud ready to install (Cut-away shows knurler)
Install tip and draw nut tight
Screw plastic cap onto the stud over the nut and draw tight



Order by the letter designations.

*36" lengths also available

On orders for less than 12 add $1.50 packing charges.

All prices F.O.B. Chicago subject to change without notice.

REMEMBER

These New Convertible Racks look like Economy Racks **but** the tips are replaceable with self-sealing THINKER BOY Tips.

Another difference—Convertible Rack Spines are 25% heavier than Economy Rack Spines.

100% Plating Capacity easily Maintained!

Now BELKE Quality, all copper, plastisol insulated plating racks *with replaceable* tips at only pennies more than the low—low prices of BELKE Economy Plating Racks.

Quick, on-the-job replacement of broken tips keeps these *New Convertible racks at full plating capacity through endless years of use.*

For high racking efficiency with reduced racking costs specify BELKE Convertible on your next rack order.

Belke MANUFACTURING COMPANY
947 N. Cicero Ave., Chicago 51, Ill.
EVERYTHING FOR PLATING PLANTS
TRADE MARK

For more data circle 382 on Postpaid Card

Free Literature

(Circle numbers on postpaid card opposite page 128 to obtain free literature)

Polishing, Buffing, Degreasing, Cleaning, Barrel Finishing, Plating, Anodizing, Phosphatizing, Baking, Vacuum Metallizing, Chromate Coating, Paint Finishing, Waste Treatment.

50. Flat-Surface Finishing Machines
Four-page catalog describes and illustrates machines for polishing bars, strips, coils, blanks, printed circuit boards, stampings, forgings, die castings. Acme Manufacturing Co.

51. Clear Lacquer
Information on Agateen No. 27, a crystal clear air-dry lacquer used by over 70 per cent of the watch-dial manufacturers in the U.S. Agate Lacquer Mfg. Co., Inc.

52. Cold Stripper
Technical sheets describe Electro Cold Stripper, a non-flammable liquid paint remover that will strip air-dry and high-bake synthetic coatings, alkyds, epoxies, vinyls, phenolics and so on. This product is useful in removing specialized coatings such as photo resists, vacuum plated coatings, and is also used in conjunction with ultrasonic cleaning operations. Available in liquid form for dipping operations or in viscous form for brush applications or flow on. Allied Finishing Specialties Co.

53. Chromate Conversion Coatings
Handy reference file on Iridite chromate conversion coatings. Allied Research Products, Inc.

54. Phosphate Coatings for Steel
Bulletin 1380B contains detailed information on Granodine phosphate coatings for steel. Amchem Products, Inc.

55. PVC Tank Lining
A six-page brochure. Amer-Plate industrial lining, a dense, flexible polyvinyl chloride sheet for lining plating, picking and other tanks and vessels. Protects steel and concrete from strong solutions. Two types available: one for existing installations, one for new work. Amercoat Corporation.

56. Fans
Bulletin DB 45-58 catalogs a complete line of air-moving equipment, including units specially designed for exhausting corrosive fumes. DeBothezat Fans Div., American Machine & Metals, Inc.

57. Copper Anodes, Oxygen-Free
Publication CA-10R2. Eight pages on OFHC copper anodes. Description of advantages (bagging eliminated, less undercutting of small grains, less sludge, low porosity, uniform dissolution, top anode efficiency). Amco Div., American Metal Climax, Inc.

58. Curved Anodes
Information on "Plus-4" phosphorized copper anodes which are curved so as to

(continued)

YOUNG BROTHERS *Baking and Drying* **OVENS**

designed and built for every product and process requirement

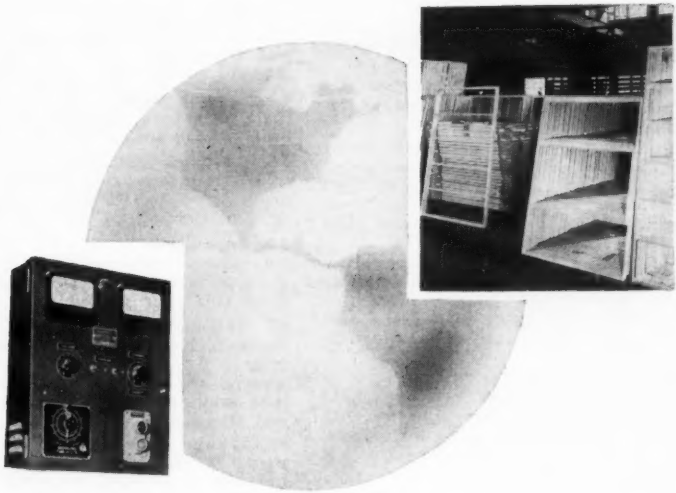
Batch and Conveyor types up to 1000° F.

Write for Bulletin 157

YOUNG BROTHERS CO. 1830 Columbus Road Cleveland 13, Ohio

Over 60 years of service

For more data circle 383 on Postpaid Card



"There's a world of difference in Anodizing when you have Automatic Current Density Control"...

...says John Gurniak of

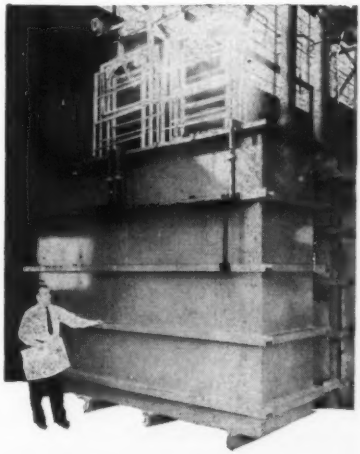
MICHAEL FLYNN MFG. CO., PA.

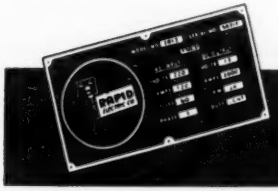
"and that big difference is the accuracy and simplicity in which a pre-determined film thickness can be controlled."

"We chose RAPID ELECTRIC'S Automatic Current Density Control rectifiers to eliminate the problem of estimating current densities with each load change. One setting, and the rectifier automatically maintains a constant current density per square foot of work."

"It's that easy"

"Once more, with the possibility of over-current virtually eliminated, MICHAEL FLYNN'S high standard of quality is assured."





THE NAMEPLATE THAT MEANS *"More Power to You!"*

RAPID ELECTRIC COMPANY

12838 Fenkell Avenue • Detroit 27, Mich. • Diamond 1-8537

2881 Middletown Road • New York 61, N. Y. • TAlmadge 6-2200

For more data circle 384 on Postpaid Card

Free Literature . . .

be parallel to rotogravure cylinders being plated. Anaconda American Brass Co.

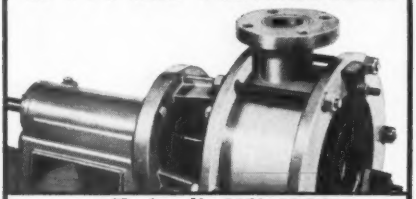
59. Cleaners
Bulletin B-8 describes a complete line of metal cleaners. Classified according to the metal being cleaned, it gives information on operating conditions, type of material, and so on. Apothecaries Hall Div., Hubbard-Hall Chemical Co.

60. Automatic Current Density Controls
Information on rectifiers with automatic controls for current density. Rectifier automatically maintains a constant current density per square foot of work. Rapid Electric Co.

61. Plating-Bath Purifier
Information on reducing waste of costly anodes by purifying plating baths with activated carbon so as to reduce rejects. Chemicals Div., Atlas Powder Co.

62. Solution Cooler
Bulletin AC-1 describes a packaged refrigeration system designed for cooling plating, anodizing and other corrosive solutions. No coils in tank. No external heat exchanger. Mayer Refrigerating Engineers, Inc.

VANTON CENTRIFUGAL PUMPS IN PVC AND POLYPROPYLENE



- To handle HCl, H_2SO_4, most acids, plating solutions.
- Lower in cost than special alloy pumps.
- Mechanical shaft seals of latest design.
- Capacity 10 through 180GPM Discharge to 160 ft. Write for Bulletin 11A.

Vanton PUMP & EQUIPMENT CORP.
DIVISION OF COOPER ALLOY CORP., HILLSIDE, NEW JERSEY

For more data circle 385 on Postpaid Card

63. Plating Barrels
Complete catalog describes plating barrels of various sizes and types. Belke Manufacturing Co.

64. Chromic Acid
Information on BFC chromic acid. Better Finishes & Coatings, Inc.

65. Cleaning Equipment
Complete information on Blakeslee vapor degreasers and metal parts washers. G. S. Blakeslee.

66. Tack Cloth
Literature on treated cloths that pick up dust and lint prior to paint finishing. Bond Chemical Products Co.

67. Self-Bonding Nameplates
Bulletin No. 161-A describes and illustrates self-sticking Poly-Plates. These nameplates identify the product, decorate and protect. W. H. Brady Co.

68. Metal-Processing Products
A six-page folder describes the products made by Bruce Products Corporation: buffing compounds, drawing compounds, cutting oils, non-rust oils, spray booth coatings, cleaners, polishing wheels, die-cut release agents. Bruce Products Corporation.

69. Gas Infrared Burners
A four-page folder describes and illustrates Burdett Radiant Gas Burners, which convert gaseous fuels into infrared radiation. Products can be heated without flame impingement. Burdett Manufacturing Co.

70. Cleaning and Finishing Machinery
A two-page bulletin describes machines, systems and processes for cleaning and finishing metal products. Cincinnati Cleaning & Finishing Machinery Co.

71. Rhodium Plating Instructions
Handy pocket-sized booklet gives complete instructions for rhodium plating, includes data on solution preparation, work preparation, temperatures and current densities, tanks, anodes, and so on. Sigmund Cohn Mfg. Co. Inc.

72. Buffing Compound Remover
Fact Sheet on Kenvert Sluff-Off X, a synthetic detergent for removing buffing compounds by soak or ultrasonic cleaning. Water soluble, does not attack steel, copper, brass, aluminum, nickel, silver or zinc. Conversion Chemical Corporation.

73. Liquid Replacement for Rochelle Salts
Details on a liquid plating additive called TPA. A liquid concentrate, it replaces Rochelle salts in bronze, brass, copper strike and copper plating solutions. Goes into solution immediately. No fuming. More uniform anode corrosion, improved efficiency. Cowles Chemical Co.

ELLIOTT

VIBRASLIDE FINISHER

VIBRATION PLUS ROTATION

Solves these 4 PROBLEMS!

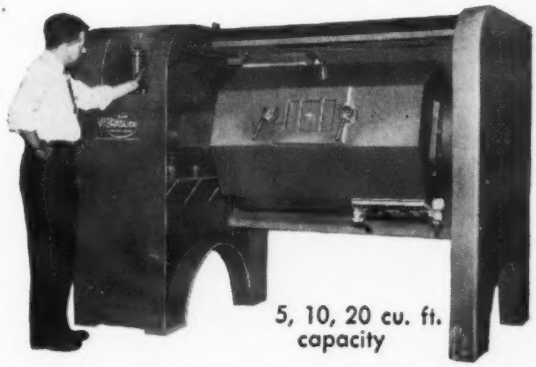
EXPENSIVE HAND OPERATIONS. Vibraslide finisher replaced 3 hand operations to deburr, radius and refinish a 21-oz. steel pinion without nicking or upsetting.

EXCESSIVE TIME CONSUMPTION. Sixteen hours of conventional tumbling failed to produce the radius required on recessed, shielded edges of an appliance stamping. Two hours of Vibraslide finishing gave the desired result.

MEETING DIFFICULT SPECIFICATIONS. A transistor mounting flange required .020-inch radius on inside edges. Conventional tumbling reduced all dimensions excessively. Vibraslide finisher produced the radius but held all other dimensions within tolerance.

DEFORMATION AND TANGLING. Various types of delicate and intricate stampings were prone to tangling and deformation in conventional tumbling. They were successfully finished without deformation or tangling in Vibraslide.

Users report they operate Vibraslide finishers an average of 80 hours a week, with MINIMUM maintenance, MAXIMUM dependability.



5, 10, 20 cu. ft. capacity

For further information, or to arrange a Vibraslide demonstration, write today on your company letterhead.

metal finish, inc.

412 Frelinghuysen Ave., Newark, N. J.

For more data circle 386 on Postpaid Card

Free Literature . . .

74. Bronze Powders
New color card shows 44 brilliant metallic bronze powders. Golds, coppers, aluminums, grays, browns and pastels. Includes complete directions for use and application. Crescent Bronze Powder Co.

75. Vibrating Barrel Finishing Equipment
Catalog 262 describes and illustrates tumbling equipment that is equipped with a mechanism which vibrates the barrel while it is rotating. Vibration is said to speed the operation, aid in finishing recesses and internal surfaces, reduce distortion, improve descaling, deburring, radii formation, burnishing and coloring operations. Metal Finish, Incorporated.

76. Spray Nozzles
Catalog No. 33-A is designed to help the user select the proper type of spray nozzle for a particular application. Complete data on each type of nozzle, including photo, construction details, capacity, recommended uses, spray characteristics, materials available. Delavan Mfg. Co.

For cleaning metal, wood and plastic surfaces before painting. Order today through your supplier.

DETRO SALES CO., INC., *Culver City, California*
Standard of the Finishing Industry Since 1934
For more data circle 387 on Postpaid Card

77. Ovens
Bulletin C describes various standard ovens for production heating and drying applications requiring temperatures up to 750 deg. F. Despatch Oven Co.

78. Automated Degreaser
Folder describes an automated degreaser that combines solvent degreasing with automatic work handling. Describes cycle, advantageous features, includes photos. Detrex Chemical Industries, Inc.

79. Tack Rags
Four-page folder describes advantages of Detroit Handy Tac Rags. Detro Sales Co., Inc.

80. Painting Systems
Form F-325 describes and illustrates finishing systems and components: spray guns, automatic spray coaters, flow and dip coaters, industrial ovens, air compressors, dust collectors, spray booths, industrial washers, hot-spray systems, paint tanks and pumps, hoses and connections, conveyors, phosphatizing systems. The DeVilbiss Co.

81. Vapor Degreasing
"Vapor Degreasing with Diamond Perchlorethylene" is the title of a 12-page technical bulletin that presents data on 13 major advantages of vapor degreasing prior to painting, plating and other finishing operations. Includes sections on essentials of vapor degreasing equipment, methods of scheduling vapor-degreaser cleanouts and solvent distillation. Diamond Alkali Co., Chlorinated Products Div.

82. Cleaner-Phosphatizer
A four-page folder on Divobond, a material that cleans and phosphatizes in one operation, produces no scale. Diversey Corporation.

83. Ovens
Literature on a complete line of baking and drying ovens. Drying Systems Co., Div. Thor Power Tool Co.

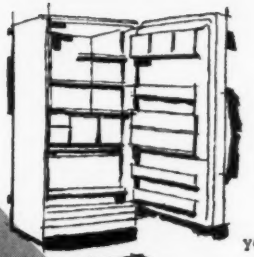
84. Water Wash Spray Booth Compound
Information on Diff. LX Klarifiant, a spray booth compound that is said to prevent clogged nozzles, booth rusting, foam, and curtain "build-up." DuBois Co., Inc.

85. Stripper
Folder describes No. 153 Stripper, a nonflammable volatile solvent-type stripper with very little toxicity. Has excellent penetrating properties, is said to be useful in removing coatings that are difficult to remove, such as melamines, epoxies, vinyls, plating rack coatings. Dytex Chemical Co.

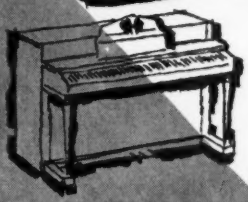
KOCH

CONVEYORIZED SYSTEMS ARE USED TO

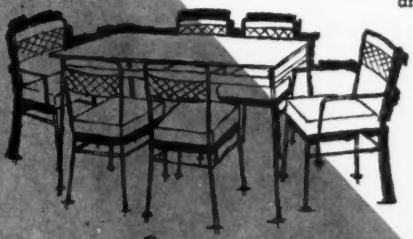
finish almost everything

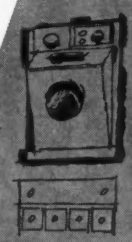


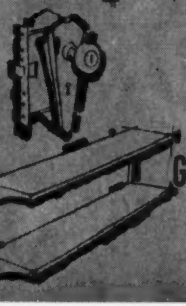
Koch's specialized engineers will make an exhaustive analysis of your production problems. They are experts in finishing methods. They know how to save you money, speed production, reduce handling, eliminate fatigue and improve your product.



Write for list of users of Koch Finishing Systems. Learn from them how you can improve your product, production and profit with Koch Finishing Systems.







GEORGE KOCH SONS, INC.

EVANSVILLE 4, INDIANA

CHICAGO DETROIT

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Free Literature . . .

86. Electropolishing Stainless Steel
Literature on baths for electropolishing stainless steel includes operating instructions for two of these baths. Electro-Glo Company.

87. Silver-Plating Process
Descriptive data, detailed plating procedures for depositing Silva-Bright, a mirror bright plate. American Platinum & Silver Div., Engelhard Industries, Incorporated.

88. Nickel Stripper
Enstrip S-60 is a metal stripper which removes nickel, cadmium, copper, zinc and silver from steel, iron alloys or magnesium. Chemical action. No heat or current required. Enthone, Inc.

89. Bright Nickel Process
Information on the Levelmax process. Assures bright, smooth nickel plates over poorly polished steel, dull copper plate, unbuffed stampings and castings. Simple to control and maintain. Federated Metals Div., American Smelting & Refining Co.

Fortune
TUMBLING MEDIA
for **Deburring and Finishing**

Preforms in over 300 shapes, sizes and bonds for all barrel and vibratory operations.
- Finest bonding materials
- No "roll-over" of burrs
- Minimum media fracture
- Maximum production

Free lab service reports proper media for your parts.

Write today for our Tumbling Media File.

Fortune Industries, Inc.
11770 DEXTER RD. CHELSEA, MICH.
Phone GR. 9-3621

For more data circle 389 on Postpaid Card

90. Sisal Buffs
Descriptive literature on Zippo Sisal Buffs, which are said to be excellent as dual-purpose (polishing and buffing) wheels. Formax Mfg. Corporation.

91. Tumbling Media
Information on preformed tumbling media and abrasive products. Over 200 sizes and bonds available. Fortune Industries, Incorporated.

92. Buffing Work-Holding Machine
Bulletin 421 describes the Hammond Cammed Junior Automatic work holding machine for holding other than round work pieces that are being buffed by a regular polishing or buffing lathe or abrasive belt machine. Hammond Machinery Builders, Inc.

93. Plating Barrel Bulletins
Bulletins on plating barrels and accessories. Bulletin No. PB-111 contains the entire series. Hanson-Van Winkle-Munning Company.

94. Centrifugal Deburring and Polishing Machine
Information on the Harperizer, a new machine for quickly producing fine, smooth finishes on parts by processing in loose abrasives without fixtures. Harper Buffing Machine Co.

95. Bright Copper
Data sheet describes Cynorex high-speed copper cyanide plating process and Cuprex acid copper plating process, tells about advantages of each. Harshaw Chemical Co.

96. Metal-Treatment Materials
New folder describes company's line of black oxide finishes, chromate coatings, cleaners, oils and strippers. Heatbath Corporation.

97. Chromate Dip for Aluminum
Information on Rodip Al-50, a chromate coating that protects aluminum with a film golden to brown in color. R. O. Hull & Co., Inc.

98. Tack Rags
Literature on Ideal Tack Rags, specially treated cloths that pick up dust and other particles just prior to application of an organic finish. Ideal Chemical Co.

99. Salt Fog Test Cabinets
A four-page folder shows various types of cabinets for salt fog and humidity corrosion testing. Data on custom-built units, special accessories, special applications, optional equipment. Industrial Filter & Pump Mfg. Co.

100. Ovens for Industry
"Ovens for Industry" catalog describes and illustrates many different types and sizes of industrial ovens. Kirk & Blum Mfg. Co.

FORMULA FOR AIRLESS SPRAYING

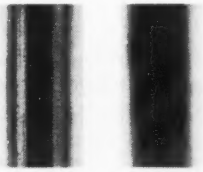
THE H-GUN + HYDRA A IRLESS = F INE F INISHING

THE H GUN™ is the only airless spray gun proved by production line experience to give finest quality finishing. The only airless spray gun that provides **total atomization!**

- **Perfect feathered spray pattern**
- **Full gun control**
- **No flooding or pigtails**
- **Material savings average 40%**

Pat. Pend.

HYDRA A IRLESS 30 is a 30-1 ratio, quality-built, airless pump designed specifically for airless spraying. Loafs on conventional work—has plenty of reserve power for the toughest jobs. The remarkable combination of the H-GUN and HydraAirless 30 meets every requirement from heavy maintenance to the



ORDINARY AIRLESS — H-GUN

Two spray patterns compare the **H-GUN** and ordinary airless. Each is same material at **equal** pressures.

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The SPEE-FLO Company

6614 Harrisburg, Houston 11, Texas.

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Free Literature . . .

101. Finishing Systems
Information on Koch conveyorized paint finishing systems. George Koch Sons, Inc.

102. Plating Course
Information on a correspondence course in electroplating. Joseph B. Kushner Electroplating School.

103. Baking and Drying Equipment
Catalog No. 560 describes and illustrates various types of baking and drying equipment. The Lanly Co.

104. Multiple-Process-Cycle Plating Machine
Information on the Select-O-Matic automatic plating machine, which allows the operator to select any one of several plating cycles when he loads the machine, merely by turning a dial. Lasalco, Incorporated.

105. Finishing Silver Plate
New technical data sheet on decorative finishing of silver plated articles. Covers hammer, satin, bright and dull butler, oxidized and semi-mirror, mirror and ultra-mirror. Lea Manufacturing Co.

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ALL TYPES
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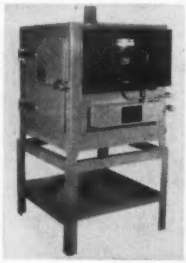

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106. Portable Sandblast Gun
Information on a portable abrasive blasting gun. Connects to existing air line. Lindberg Products Company.

107. Electropolishing Solution
Technical Data Sheet 95 describes a liquid acid material used to electropolish steel and stainless steel. Called Metex Electropolish BS, this solution produces a brilliant finish on both steel and stainless steel, is also useful for deburring. MacDermid, Inc.

108. Cleaning and Preparing Metal Surfaces
A 28-page guide to modern metal-cleaning and preparation methods. Magnus Chemical Co., Inc.

109. Space-Saving Dip-Finishing System
Data on a dip finishing machine in which the tank raises to immerse parts hanging from a conveyor. It saves space since a smaller tank can be used when space need not be provided for gradual work withdrawal. R. C. Mahon Co.

110. New Polishing Wheel
Information on the Type BL Grind-O-Flex polishing wheel. It is made of a series of coated abrasive flaps spaced apart slightly and slashed into tiny filaments so that when the wheel rotates it resembles a rotary brush coated with abrasive. Useful for satin or brushed finishing. Merit Products, Inc.

111. Copper Anodes
Information on "Phosphor-Brite" rolled copper anodes for acid copper plating baths. Univertical Corp.

112. Automatic Cleaning Machines
Information on automatic conveyorized cleaning and metal treating machines. Metalwash Machinery Corporation.

113. Glass Shot
Information on Microbeads Glas-Shot, microscopic glass beads for use in wet and dry blasting equipment for cleaning polishing, peening and finishing. Microbeads, Inc.

114. Heat-Resistant Gold Finish
Brochure gives complete data on Gold Sicon, an attractive gold-colored finish that withstands temperatures up to 500 deg. F. without peeling, flaking, discoloring, etc. Midland Industrial Finishes Co.

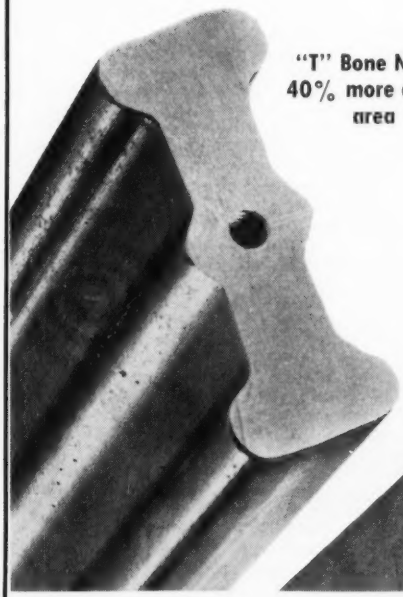
115. Polishing Cost Check
Cost Check 5-4-5 Kit helps to cut costs in grinding, polishing, finishing. Minnesota Mining and Manufacturing Co.

116. Drum-Handling Tools
Literature on a line of drum-handling tools and equipment: drum wrenches, drum upenders, carts and so on. Morse Mfg. Co., Inc.

LET'S TALK!

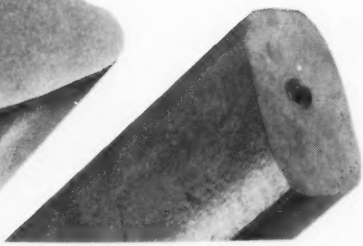
PLATING WITHOUT BAGGING

The Univertical family of anodes are known to corrode more evenly and to give smoother plate *without the use of anode bags.*



"T" Bone Nickel
40% more anode
area

Rolled
Phosphor-Brite
for acid copper



Rolled
Electro-Brite
for cyanide
copper

For further information about Univertical anodes for the plating industry or technical assistance, may we invite you to contact us directly in order to learn all the facts.

UNIVERTICAL CORPORATION

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Free Literature . . .

117. Plastic Tubing
Bulletin No. 660 lists dimensions, operating data, other product details for four types of tubing for compressed air, instrumentation, liquids, etc. Munray Products Div., Textron, Inc.

118. Electrostatic Spray System
Six pages on Gyromat directional, centrifugal electrostatic spraying equipment. The Gyromat Corporation.

119. Lacquer, Clear
Information on 2105 Clear Lacquer for the protection of brass, silver, bronze and copper. G. J. Nikolas & Co., Inc.

120. Phosphate Coatings
Four-page brochure on Northwest Interlox phosphatizing compounds describes products for soak and spray operations, wiping on large parts, and so on. Also gives information on precleaners, cleaning addition agents, acidulated rinses. Northwest Chemical Co.

121. Helps Rinsing
Data sheet on Oakite Rinsite, an additive for rinse water that prevents water spotting and retards rusting. Oakite Products, Inc.

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A foolproof solution which has been in use for over 6 years in light and heavy production.

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122. Solid Aluminum Etchant
Bulletin describes Pennsalt solid aluminum etchant and a new pushbutton makeup system for adding it to etching tanks. Pennsalt Chemicals Corporation.

123. Washing and Phosphatizing Equipment
Bulletin 659-1. 8 pages. Description of a pre-engineered modular power-spray washing and phosphatizing machine. Allows the user to add process stages as he needs them. Ramco Equipment Corp.

124. Electrostatic Spray Gun, Hand-Held
Twelve pages. "Spray Painting with the Electrostatic Hand Gun." Principles and uses of recently introduced hand-held electrostatic spray painting gun. Photos of production applications. Ransburg Electro-Coating Corp.

125. Overspray Collector
A four-page folder gives general information on RP paint arrestors, dry filters that remove overspray paint from exhaust air. Includes installation instructions, performance data, construction details. Research Products Corporation.

126. Paints, Pearlescent
Information on air-dry and baking-type pearlescent finishes. Rona Pearl Corp., Div. of Rona Laboratories, Inc.

127. Precision Mechanical Finishing
A 30-page catalog on precision mechanical finishing and automatic finishing processes outlines in detail the various types of finishing and abrading processes such as grinding, deburring, descaling and polishing. Illustrations and detailed descriptions of conventional models, Roto-Matic automatic finishing machine and newly developed Vibratron, which employs a vibratory abrasive action. Section devoted to abrasive chips and compounds points out factors involved in holding to precision dimensional tolerances. Roto-Finish/Ransohoff.

128. Steam Traps, Temperature Regulators, Heating Specialties
Condensed catalog contains twelve pages of technical data on steam traps, temperature regulators, heating specialties. Sarco Company.

129. New Wool Polishing and Compounding Pad
Information on the Ray-Buf, a new all-purpose polishing and compounding pad that is said to produce higher lusters more quickly. Schlegel Manufacturing Company.

130. Acid Gold Plating Process
Bulletin FTC-G describes Karatclad acid gold plating process, includes copy of new Federal Trade Commission ruling covering gold plating. Sel-Rex Corp.

131. Submerged Filter Systems
Bulletin No. 551 describes SUB submerged filter systems, which are designed to filter expensive solutions such as precious metal plating solutions with virtually no loss. Sethco Manufacturing Corp.

132. Cleaning Machine
Bulletin 107 describes the Simplicity Vibra-Washer, a machine designed to clean or process ferrous and non-ferrous machined parts, stampings and castings at high production rates. Shows how the machine is constructed, how it operates, etc. Industrial Washer Div., Simplicity Engineering Co.

133. Solvents
Information on acetates, alcohols, aliphatic hydrocarbons, alkanolamines, aromatic solvents, chlorinated hydrocarbons, glycols and polyglycols, glycol ether, other solvents. The Solvents and Chemicals Group.

134. Technical Data on Hot Spray
Revised edition of the booklet "Why Hot Spray?" includes technical information on the advantages and possibilities of hot spray painting process. Spee-Flo Company.

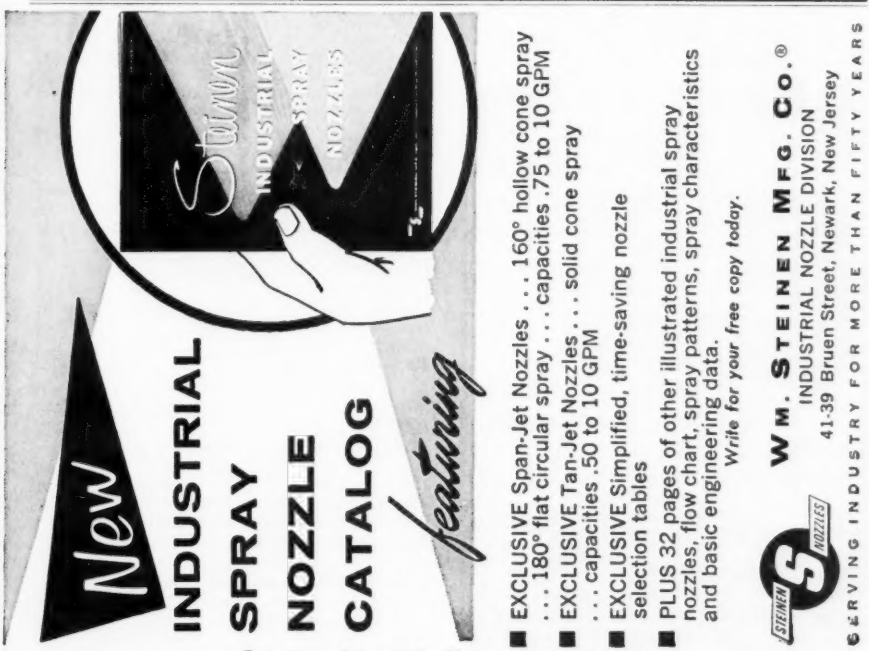
135. Finishing Systems
A 36-page book describes and illustrates complete finishing systems and components such as washers, dryers, bake ovens, flow coat systems, dip-painting systems, spray painting systems, others. Includes diagrams of several systems, comparison of operating costs for Spra-Con systems vs. other types. Also has a page of useful engineering formulas and constants. The Spra-Con Company.

136. Spray Nozzle Arrangement for Cleaning
Data sheet 4277 shows suggested arrangement of spray nozzles for typical metal cleaning and rinsing installations. Spraying Systems Co.

137. Spray-Nozzle Catalog
Nozzle-selection tables, descriptions of specialized types of nozzles, exclusive designs, plus 32 pages of flow charts, spray patterns, spray characteristics, and basic engineering data. Wm. Steinen Mfg. Co., Industrial Nozzle Div.

138. Buffing Compositions
Bulletin describes 11 special liquid compositions for buffing and coloring. Grade evaluations on liquid tripoli and liquid

(continued)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■ EXCLUSIVE Span-Jet Nozzles . . . 160° hollow cone spray . . . 180° flat circular spray . . . capacities .75 to 10 GPM
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Free Literature . . .

stainless compositions. Information on customer service lab. Frederic B. Stevens, Inc.

139. Zinc Plating Additive
Data on Zinc Brite, a cleansing and purifying agent for cyanide zinc plating solutions. Sulphur Products Co., Inc.

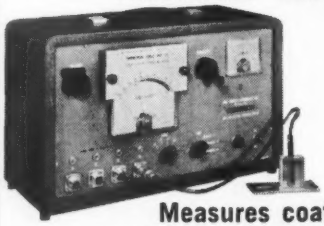
140. Sanders, Air-Operated
Data on portable air-operated sanding machines. Sundstrand Machine Tool Div. of Sundstrand Corp.

141. Vacuum Metallizing Coils
New catalog lists 164 sizes and shapes of vacuum metallizing coils, tells about typical applications for each of them. Sylvania Electric Products, Inc., Chemical & Metallurgical Div.

142. Soluble Precious Metals for Electroplating
Folder lists gold, rhodium, palladium, platinum, silver, and alloy precious metal plating solutions available from stock. Technic, Inc.

143. Etch Primer
Data on Gripalloy, an etch primer available in black and colors. Used as primer or finish coat. Tenax Finishing Products Co.

The Latest
DERMITRON
NON-DESTRUCTIVE THICKNESS TESTER!



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Instantly measures the thickness of metallic and non-metallic coatings and films.

Write for complete information.

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UPA
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144. Cob Grit for Blasting, Tumbling
Information on corn cob grits that are used as tumbling media and in blast cleaning. Ti-Co Industries, Inc.

145. Brass Plating Solution
Technical bulletin on True Brite brass solution, available in various colors. True Brite Chemical Products Co.

146. Temporary Protective Film
Bulletin No. 67, on Fabrifilm, an easily removable protective coating that protects surfaces from abrasion, scuffing and corrosion during in-plant processing. This temporary film comes off during normal alkaline cleaning or steam cleaning operations that precede finishing. Turco Products, Inc.

147. Cadmium Plate, Bright
Technical Bulletin No. CDP-53 describes Bry-Cad, includes data on solution composition, brighteners, temperature, agitation, equipment, surface treatment and bright dipping, additions, and so on. Udylite Corporation.

148. Dermitron Chart
Chart enables users of the Dermitron coating thickness tester to determine whether this instrument can be used to measure the thickness of a particular metal on a given basis metal. Unit Process Assemblies, Inc.

149. Drum Rollers
Information on the U. S. line of adjustable drum rollers, which mix, blend and tumble materials right in the original containers or in various sizes of drums. Made of conductive neoprene rubber to eliminate static electricity. Process Equipment Div., U. S. Stoneware.

150. Centrifugal Pumps
Catalog describes PVC and polypropylene centrifugal pumps, built to handle acids, plating solutions, other corrosives. Vanton Pump & Equipment Corp., Div. of Cooper Alloy Corp.

151. Acrylic Coatings
Performance and application information on acrylic-based coatings. The Varnish Products Co.

152. Rack Trucks
Information on rack trucks designed for batch-type baking operations. Wilder Mfg. Co., Inc.

153. Cleaning and Treating Aluminum
Bulletin F-2561. Four pages. Products for etching, cleaning, desmutting, paint stripping, barrel finishing, brightening, paint preparation, deoxidizing. Products for use in barrel finishing, desmutting, etc. Wyandotte Chemicals Corp.

154. Metal-Decorating Ovens
Information on standard and special metal-decorating ovens and can body ovens. Bulletin 9-L. Young Brothers Co.

Classified Advertising

Space on this page is available for advertising of Services, Employment, Used Machinery & Equipment, Etc. Sold in inch units, one col. wide. Rate: $22 per col-inch.
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Consultants and specialists in corrosion, weathering and sunlight testing.

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Nationally known manufacturer with national sales organization would like additional lines to sell to metal finishing supply jobbers. Would consider any small equipment or accessory line. Box No. 125, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

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Outstanding opportunity for aggressive distributors and sales engineers. Nationally advertised and forcefully merchandised line of electrostatic paint spraying equipment. Exclusive territories open due to new expansion program. Only capable and experienced representation need apply to Ionic Electrostatic Corp., 111 Monroe Street, Garfield, N. J.

FOR SALE — 3-Stage Power Washer

Blakeslee-Wash, Rinse and Dry, 38' 6" long, flight type belt—24" wide, steam heated (from power house). This machine is in daily operation and in good condition. Complete wth all necessary operating equipment. May be inspected during work week. See Mr. W. D. Bachtel or phone Elyria, FAirfax 3-3151.

BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE CO.
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FOR SALE

CENTERLESS TUBE POLISHING MACHINE

Tandem of three Production Machine Co. Model High Speed 101. Capacity ¼" to 4" diameter. Can be seen in operation.

IONIC ELECTROSTATIC SPRAY UNIT

Complete with high voltage pack spray guns, pressure tank and controls. Can be seen in operation.

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Midwest manufacturer of metal cleaning, degreasing and surface treating chemicals has a challenging opportunity for a chemist thoroughly familiar with the formulation and use of these types of products. Advancement with this progressive company will depend upon the ability and initiative of the man selected for this position. BS degree required, advanced degree preferred. Salary open. All replies held confidential. Box No. 122, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

BUFF SALESMAN

To sell buffs to manufacturers in N. Y., N. J., Pa., Del. and Md. Requires knowledge or experience in buffing operations, adaptation of buffs for specific uses as well as familiarity with buffing compounds and construction of buffing wheels.

Area needs careful study and analysis to determine potential. Knowledge and experience in metal finishing is more important than sales experience. Salary and incentive plus travel expenses.

Please submit resume and salary requirement to: Box No. 121, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

Organization interested in acquiring manufacturing companies servicing the metal finishing industry. Interested in both small and large companies. All inquiries held confidential. Box No. 126, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

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METAL CLEANING EQUIPMENT SALES SPECIALISTS

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Conveyorized Ultrasonics

We are now ready to enter into a full-scale National marketing program on our revolutionary AutoSonex metal cleaning equipment, and require the services of the most experienced, intelligent, and successful sales representatives in each marketing area.

AutoSonex is a new packaged cleaning machine which employs conveyorized ultrasonics to introduce automation to the cleaning process for the first time. It provides remarkable advantages in better, more efficient cleaning at significant savings of time, space, cost, manpower, and maintenance. Live inquiries from hundreds of manufacturers as a result of initial stories in various magazines, give us reason to believe there is a vast, virgin market for this product—as well as for numerous additional products and applications now in advanced stages of development.

If you can qualify as a top man with the ability for creative sales engineering and determination to do a top job, please write today in detail, outlining territory covered, experience and background, and if you are an individual or organization. Your reply treated in strictest confidence.

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Opportunity for companies presently handling chemicals and industrial finishing equipment to represent us in exclusive territories throughout the United States. Excellent commission arrangement. Replies held strictly confidential.

(See our advertisement on page 97 of the 1960 Products Finishing Directory.)

Write to Sales Manager

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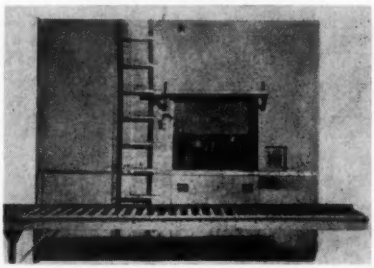

Model 30-16-14 ROTO-MATIC (mfg. by Roto-Finish Co.) HIGH ADJUSTABLE SPEED FINISHING MACHINES. (16) vertical spindles. Merry-go-round type. Abrasive slurry type. Like photo above. Like new condition. Mfg. new in 1956.

Also have (1) MODEL 4VS-5-4-20 ROTO-MITE VARIABLE SPEED 4-SPINDLE VERTICAL ABRASIVE SLURRY FINISHING MACHINE. Mfg. new in 1956.

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news of the finishing industry

company news
new positions
new plants
meetings

NEW PLANTS

New Cowles Plant for Joliet, Illinois

Cowles Chemical Company, Cleveland, Ohio, has begun construction of a new plant in Joliet, Illinois, according to R. F. Huntley, president. "It is fitting," he said, "that we undertake this major expansion in this, our 75th Anniversary Year."

The company's major basic chemicals, detergent silicates, and products for commercial laundries, food processors and metal finishers will be manufactured in Joliet upon completion of the plant next summer. The Promat Division of Poor and Company, Waukegan, Illinois, purchased by Cowles on September 1 of this year, will be moved to Joliet when the plant is ready.

Pfaudler To Build Research and Development Center

The Pfaudler Co., a division of Pfaudler Permutit Inc., has announced plans to build a three-quarter-million-dollar Research & Development Center in Henrietta, a suburb of Rochester, N. Y.

Plans for the 85-acre site include construction of campus-like buildings which will also house functions other than research and development. Although plans at this point are sketchy, the company would eventually like to have separate buildings for its corporate headquarters, Pfaudler division administration and International Division. The technical center will be the first to be built.

The technical center will initially have approximately 40,000 square feet of floor space to which additions will be made to accommodate technical growth. Pfaudler's present technical space totals only 25,000 square feet and is in two sections of the city.

"Over 100 scientists, engineers and technicians will be assigned to the new center," said Cloyd Betzer, technical manager. He added, "We should more than double our technical personnel by 1964."

Minnesota Mining Plans New Australian Plant

Plans for the construction of a coated abrasives plant in Australia have been announced by Minnesota Mining & Manufacturing Co.

The 3-M Company revealed that its Australian subsidiary will soon begin construction on the new plant, to be built at the site of the present 3M plant in St. Mary's, New South Wales. It is expected that the new plant, which will have about 40,000 square feet of floor space, will be in production early in 1962, 3M reports.

COMPANIES

Udylite To Sell Butcher Subsidiary On West Coast To Wilbur-Ellis

The Udylite Corporation has sold the L. H. Butcher Company, a wholly owned subsidiary, to Wilbur-Ellis Company. The sale is subject to ratification by both companies' boards of directors.

The L. H. Butcher Company started business in 1890 as a wholesaler and distributor of a complete line of industrial chemical supplies and equipment. At the present time the company, with headquarters in Los Angeles, operates in the eleven Western states. Distribution facilities are in Los Angeles, San Francisco, Fresno, Brawley and Woodland, California; Portland and Medford, Oregon; Seattle, Washington, and Salt Lake City, Utah.

Business will be continued with no change in personnel, as a division of Wilbur-Ellis Company, which has for forty years been in the import and export and general trading and distributing business.

Cecil Thornton Retires From MacDermid

Cecil Thornton, sales representative for MacDermid, Incorporated, in the Rochester, N. Y. territory, has retired from the company after 36 years service. At a recent gathering of the Mac-

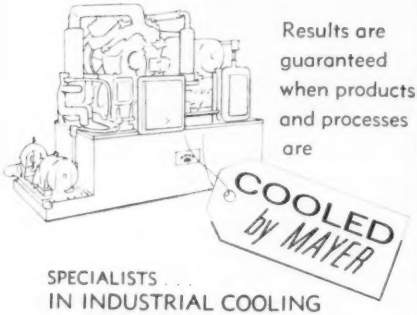
Cecil Thornton (right) and his wife, Marian, are presented with a silver coffee service by the President of MacDermid Incorporated, Harold Leever (center) shown garbed in the traditional Scot's dress at the awards ceremony climaxing the annual meeting.

Dermid "Clan", Harold Leever, president of the Waterbury, Connecticut manufacturer of metal cleaning, plating and finishing chemicals, presented a sterling silver coffee service engraved with the names of company officers and salesmen to Mr. and Mrs. Thornton. Fred Johnson will take over as MacDermid sales representative in the Rochester territory.

MF/301

For Anodizing (Regular and Hard Coat) and Plating Processes . . . You Need the

New MAYER PACKAGED ACID CHILLER



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IN INDUSTRIAL COOLING
For Over 90 Years
Bulletins on Request

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Enthone Appoints Licensee In Mexico

Butcher-Udylite de Mexico, S. A. de C. V., (BUMSA), Mexico City, has been licensed by Enthone, Inc., New Haven, Connecticut, subsidiary of American Smelting and Refining Company, to manufacture, sell, and service the complete line of Enthone products in Mexico. BUMSA is a subsidiary of the L. H. Butcher Company, Los Angeles.

Navy Searches for Better Lacquers

The Aeronautical Materials Laboratory of the Naval Air Material Center, Philadelphia, is looking for lacquers that are better than the anti-icing lacquers covered by specifications MIL-L-22304 (Wep).

Manufacturers interested in this program should submit materials for evaluation to the Director, Aeronautical Materials Laboratory, Naval Air Material Center, Philadelphia 12, Pa. (Attention XM-44-JO).

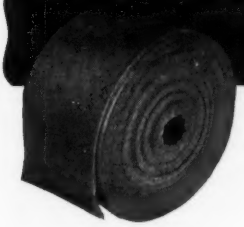
H-VW-M Improves Anode Bag Service

The four most popular styles of anode bags—in 22 sizes each—are now stocked at Hanson-Van Winkle-Munning Company's Grand Rapids plant.

According to J. A. Badaluco, H-VW-M vice-president, "Because few customers are willing to stock extra sets of anode bags, almost nine out of ten orders received fall into the 'urgent' and 'rush' category. Previous to stocking anode bags at Grand Rapids, customers often had to wait several days for rush orders. Now we can ship the same day orders are received."

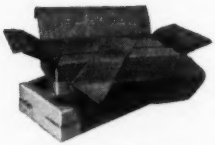
For Dust Free Finishes!

BOND TACK CLOTH



In ROLLS

Cut off any size piece to use as needed.



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Cut and folded. Ready to use.

STAYS SOFT AND TACKY — A SPECK-FREE FINISH EVERY TIME

Now Available In Rolls or Cut Bulk—White or Gold In Four Different Types of Cloth

Get your Tack Cloth packed just the way it's easiest for you to use . . . either in 150 yard rolls of 36" wide cloth or in handy cartons . . . 100 or more Tack Cloths to the carton.

No matter which way you buy it, you can be sure that every square inch will stay SOFT and TACKY until the very last bit is used up! Choice of Standard, Extra Tacky or Less Tacky, as desired.

The Cut Bulk size is 18" x 36" . . . folded to 4½" x 18" or 9" x 18" for ease of handling. ALL BOND TACK CLOTH is *Spontaneous Combustion Proof, Lint-Free and Wax-Free.* Gives a sparkling speck-free Finish *every time.* Clean and Sanitary. No waste.

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Finishing-Industry News . . .

New Officers for Westergaard Plating

Officers of the newly incorporated Westergaard Plating Co., Joliet, Ill., are as follows: J. M. Westergaard, president; C. Arthur Oswald, vice president; Mrs. Esther Spencer, secretary-treasurer.

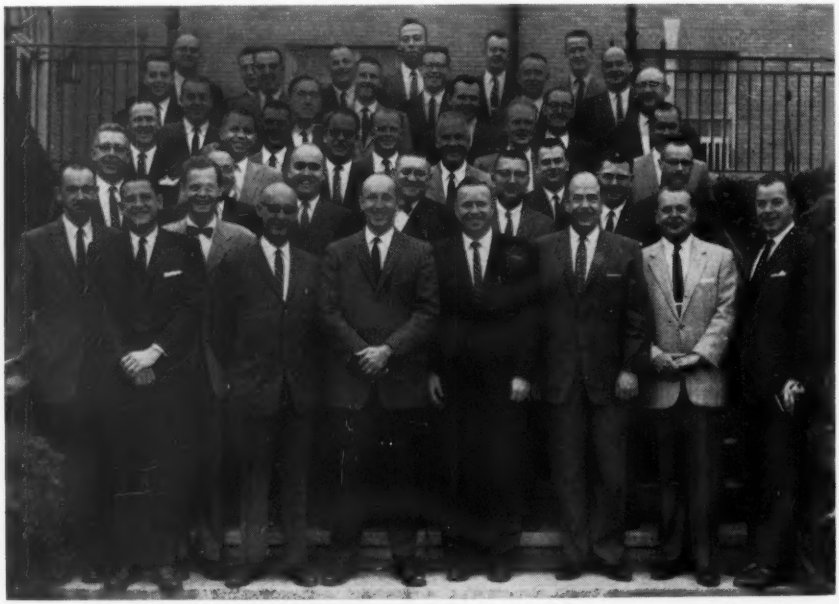
Hanson-Van Winkle-Munning Company Holds Sales Education Meeting

Hanson-Van Winkle-Munning Company's sales force recently attended a sales education meeting in Hershey, Pennsylvania. The three-day session consisted of 24 hours of lectures and technical discussions of the company's new processes and equipment.

Micro Deburring Holds Open House in New Plant

Micro Deburring Company recently held open house for its new $500,000 plant at 1830 East Lunt Ave., Elk Grove Village, Ill.

Officers of Micro Deburring Company are R. V. Leonardson, president; Robert A. LaPointe, vice-president; and George J. Peterson, Micro



From left to right, are: H-VW-M representatives at sales meeting: (bottom row) R. Bauer, W. J. Harper, G. K. Robins, E. E. Carlson, W. M. Teets, H. B. Koehler, M. B. Diggin, G. M. Herring and R. E. Waite. Second Row—R . E. Creamer, A. C. Pearson, C. E. A. Solla, C. T. Peebles, C. E. Campbell and W. H. Brown. Third Row—W. R. Lockwood, H. F. Allen, E. C. Bosl, T. E. O'Callaghan, R. M. Norton, P. C. Burnham and M. A. Tardiff. Fourth Row—J. A. Badaluco, R. R. Granquist, T. M. Rodgers, W. A. Mercer and F. Badaluco. Fifth Row—C. R. Smith, H. L. Grutter, J. S. Hart, A. A. Nortof, W. J. Slattery, Jr. and C. A. Pickering. Sixth Row—R. K. Martin, J. P. Muscarella, Jr., W. L. Guiltinan, F. H. Dayton, J. D. Kershaw and D. H. Morris. Back Row—R. G. Marshall, W. M. Pike and W. S. Wilkinson.

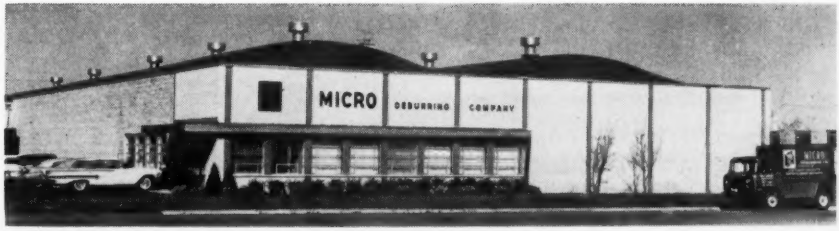


Fig. 1—New plant of Micro Deburring Co., in Centex Industrial Park, Elk Grove Village, Ill.

secretary-treasurer and sales manager.

Micro Deburring, the largest custom barrel finishing company in the world, is also Midwest distributor for Minnesota Mining & Manufacturing Co., St. Paul, Minn.; Rampe Manufacturing Co., Cleveland, Ohio; D. L. M. Equipment Co., Cincinnati, Ohio; Norton Co., Worcester, Mass.; and Stearns Magnetic, Milwaukee, Wis.

This marks the fourth expansion in the last decade for the 1946-organized firm, which grossed more than $500,000 last year as a fully-automated, custom barrel finishing operation.

The new single-story structure occupies 25,000 square feet on a 78,000-square-foot tract that is just a few minutes from O'Hare International Airport, and is linked with or adjacent to the Tri-State Tollway, the Northwest Tollway, the Northwest Expressway, Chicago & Northwestern Rail-

(continued)

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THE NEW MIRACLE

STRIPEX #153

NO HEAT NECESSARY!

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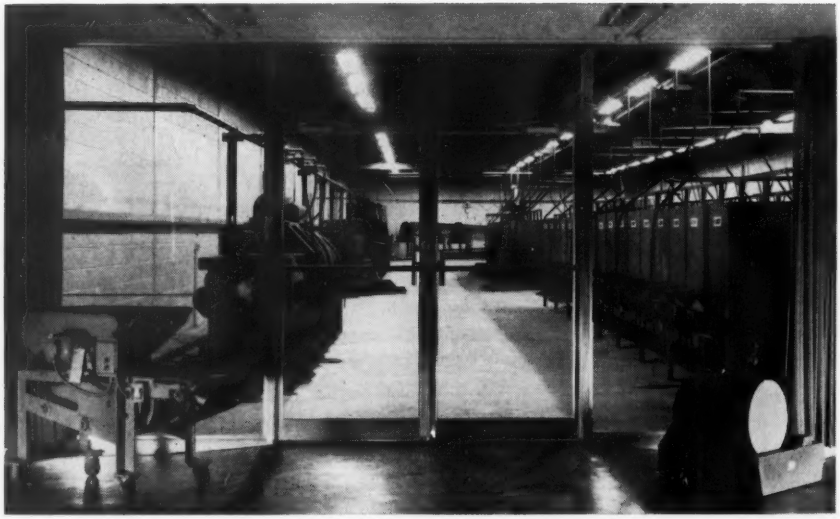

Fig. 2—Glass wall of display and conference room affords view of production lines in action. Customers can see machinery and equipment in use when draw drapes uncover 25-ft. wide expanse. Line of processing barrels is at left, chip-storage bins are at right.

Fig. 3—World's largest custom deburring establishment has two parallel production lines. Complete setup includes 36 barrel finishing and vibratory machines with capacities varying from 1/2 cubic foot to 40 cubic feet. Two complete overhead tramrail systems are utilized. Each is 150 feet in length and each has two traveling beams 50 ft. wide.

way, the Milwaukee Road rail line, and the Belt Railroad.

Plant facilities include display rooms for showing the latest in barrel finishing and vibratory equipment, research and development laboratories, production departments, warehouse of barrel finishing materials.

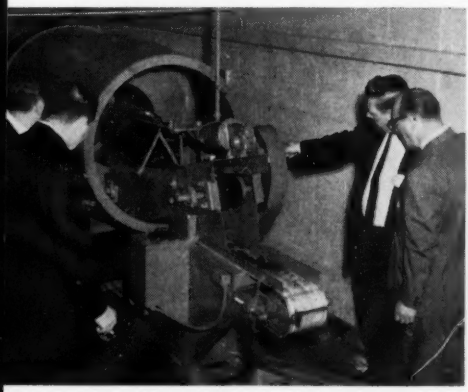

Fig. 4—New combined barrel finishing machine and chip separator designed and built by DLM Equipment Co., Cincinnati, Ohio, installed in new Micro Deburring plant, was demonstrated during the "Open House."

NEW POSITIONS

Gerald J. Naves Jr. has been appointed eastern regional sales engineer for **Technic, Inc.**, Providence, R. I. Mr. Naves will be responsible for sales and service to eastern customers of Technic gold, platinum, rhodium and palladium solutions for plating.

Gerald J. Naves, Jr.

William Rothstein

William Rothstein appointed regional sales engineer for **Technic, Inc.**, Providence-based producer of precious metals for electroplating.

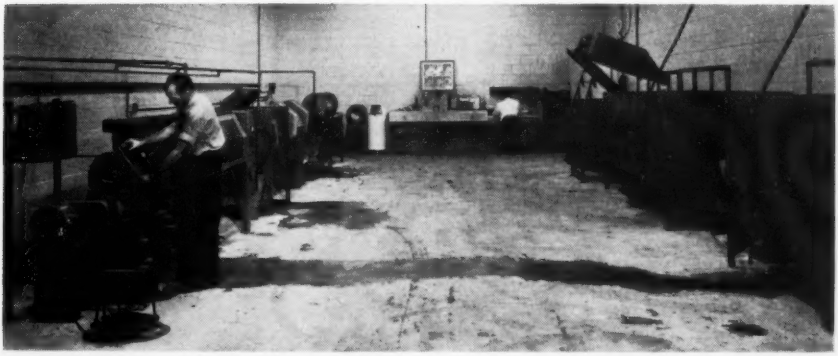

Fig. 5—Laboratory at Micro Deburring's new plant is a miniature barrel finishing shop. In-plant research center is a field laboratory for determining new and better ways to do the customers' work. The laboratory is an experimental proving ground for new production processes and aids company in discovering refinements for processes already in standard usage. (Figs. 1, 2, 3, 5 courtesy Micro Deburring, Fig. 4 by PRODUCTS FINISHING.)

Parker Rust Proof Company, Detroit producer of "Bonderite" products, announced the following changes in its service-sales staff:

Ralph D. Wallin has been promoted to assistant regional manager of the Southern Region, headquartered in St. Louis, Mo.

Raymond Dhue, Jr., will move from Dallas, Texas to Louisville, Ky., and take responsibility for Parker customers and new sales in the latter area, reporting to the Southern Regional Office in St. Louis.

Edgar J. Baxter will supervise Parker Rust Proof Company accounts and new sales in Texas. He will move to Dallas from the Los Angeles area, where he has represented Parker for nine years.

★ ★ ★

Hanson-Van Winkle-Munning Company promoted **Everett E. Carlson** and **Albert A. Nortof** to chief chemist and process electrochemist, respectively.

In his new position, Mr. Carlson will be responsible for all functions of the Matawan general laboratory, including customer service, plating facilities, and analysis.

Albert A. Nortof

Everett E. Carlson

Mr. Nortof has recently transferred from H-VW-M's Cleveland office, where he was a field electrochemist, to accept his new post at the company's New Jersey headquarters. He joined the company in 1953.

CORROSION-RESISTANT THROTTLABLE PLASTIC GATE VALVES

- Available in: Penton, PVC and Styrene-Copolymer
- Non-contaminating and non-galling
- Full flow and no pressure drop—like a gate valve
- Throttling control—like a globe valve
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MARYLAND SPEAKS

"Notwithstanding that I have had twenty years of experience I feel that I have benefitted greatly from your course; it has filled a void in my plating knowledge that has existed since my apprenticeship," writes Dan Eno, master plater for the U. S. Naval Ordnance Labs., of Silver Spring, Md. Why not try this course for yourself? Write Dr. Joseph B. Kushner, Electroplating School, Box 2066, Evansville 14P, **today!**

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James L. Dickens has joined **Enthone, Inc.,** New Haven, Connecticut, subsidiary of American Smelting and Refining Company, as a technical service chemist.

James L. Dickens

Philip T. Rogers

Automotive Rubber Company, Detroit, has appointed **Philip T. Rogers** as vice-president and general manager of its ARco-Wynn Valve Division.

The Eagle-Picher Company has announced the appointment of officers for the company's Chemicals and Metals Division. **Miles M. Zoller,** vice-president and director of The Eagle-Picher Company was named president of the division. Other officers are **William D. Atteberry,** executive vice-president; **Donald R. Carter,** vice-president, sales; **Claude O. Dale,** vice-president, mining; and **Melvin F. Chubb,** vice-president, electrochemical.

★ ★ ★

F. Leonard Bryant, a vice president of **Hooker Chemical Corporation** since 1957, has been elected executive vice president and a director.

Also elected directors are **Thomas F. Willers,** a Hooker vice president, and **Werner P. Gullander,** executive vice president and a director of General Dynamics Corporation. Mr. Gullander will fill the vacancy created by the resignation of E. Lewis Burnham, a Hooker director since 1924.

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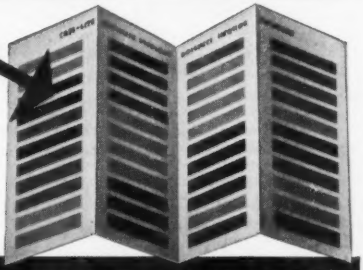

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Harry P. Wiseman appointed supervisor-public relations of **Diamond Alkali Company.**

In his new position in Diamond's general sales department, Mr. Wiseman will be responsible for this chemical producer's public relations program, general publicity and editing company publications.

★ ★ ★

Michael Sandor appointed manager of plating chemicals for **Nuodex Products Company, a division of Heyden Newport Chemical Corporation.**

SOCIETIES

Benjamin B. Dayton Elected President of American Vacuum Society

Benjamin B. Dayton, technical director of Consolidated Vacuum Corp., a subsidiary of Bell & Howell/CEC, recently was elected president of the American Vacuum Society. He succeeds Wilfred G. Matheson of Sylvania Electric Products, Inc.

Other officers elected at the Society's national convention in Cleveland were C. Robert Meissner, Georgia Institute of Technology, president-elect; George W. Carr, Vacuum Specialties Co., Inc., treasurer; and Harold C. Weingartner, Arthur D. Little, Inc., secretary-clerk.

Mr. Dayton said one of the major events during his year in office would be a joint congress of the American Vacuum Society and the International Organization on Vacuum Science and Technology next October in Washington, D. C.

Sharpe Elected President of Spray Painting Association

Kenneth B. Sharpe

Kenneth B. Sharpe, executive vice president of Sharpe Manufacturing Co., West Coast manufacturer of spray painting equipment, has recently been elected president of the National Spray Painting and Finishing Association.

Mr. Sharpe

Portable Sandblast Gun

—Complete— simply connect to air line

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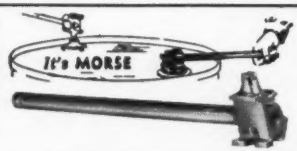
Instantly loosens, tightens 95% all plugs or bungs in steel drums. Has 16" extra-strong steel tubing handle. Wgt. only 2 lbs. Order 1 or more today!



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states that "the purpose of the ASPFA will continue to be the education of the trade and public in the ways and means of spray painting, and combatting restrictive legislation as regards spray painting."

Other newly elected association officers are Frank R. Ritt, DeVilbiss Co., Toledo, Ohio, secretary, and Clyde E. Small, Campbell-Hausfeld Co., Harrison, Ohio, treasurer.

Florida Professor and Dow Researcher Share Howe Award at Metal Show

A Dow Chemical Co. research engineer and a University of Florida professor of metallurgy shared in American Society for Metals' oldest honor, the Henry Marion Howe Medal, presented at the recent Metal Show.

They are Dr. John B. Clark, research engineer, Dow Chemical Co., Midland, Michigan; and Dr. Frederick N. Rhines, head, Metallurgical Research Laboratory and research professor of metallurgy, University of Florida, Gainesville, Florida.

Presentation was at the Society's Annual Awards Luncheon in the Philadelphia Trade and Convention Center. This was a feature of the 42nd National Metal Congress and Exposition, October 17-21. Edward G. Budd, Jr., president of The Budd Co., Philadelphia, presented the featured address "The Acceptance of Change."

Frederick N. Rhines

John B. Clark

ASM's Howe Medal was established in 1922 to honor authors of the most outstanding Metal Congress technical paper, and is nearly as old as the Society itself.

(continued)

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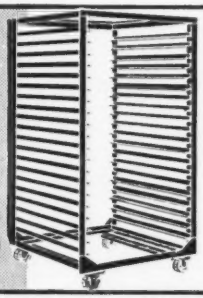

27 Standard Style and 150 Standard Size platform, shelf, tray, rack, stake, bin, box and table trucks to select from. Special sizes can be furnished.

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A native of Canada, Dr. Clark received his undergraduate degree in metallurgical engineering at University of Toronto in 1948. He earned his master's and doctorate at Carnegie Institute of Technology, Pittsburgh, in 1951 and 1953.

Dr. Rhines, before assuming his present position at the University of Florida, served from 1935 to 1959 at Carnegie Institute of Technology, the last ten years as professor of light metals and staff member of the school's Metals Research Laboratory.

TRAINING COURSES

Nordson Announces Training School Dates

The Nordson Training School has announced dates for its training schools for operators of airless spray equipment. Conducted by Frank Ziroe, Nordson technical service director, the school features instruction in the use and maintenance of airless equipment. Sessions also cover modern coating materials and their application problems. The class is divided between lectures and practice work sessions, using facilities of the Nordson laboratory.

School dates for the first half of 1961 are as follows: January 10-13; February 14-17; March 14-17; April 11-14; May 9-12; June 13-16.

The size of individual classes is limited, thus it is advisable for those wishing to attend to make application as far as possible in advance. No tuition is charged. Anyone generally interested in airless spray is invited to attend. Application blanks may be obtained from the Nordson Corporation, Amherst, Ohio.

San Francisco A. E. S. Sponsors Plating Course

The San Francisco Branch of the American Electroplaters' Society is sponsoring a plating class in Palo Alto, Calif., this year. The course is held at Cubberly Adult Evening High School and the instructor is W. V. Ferry. Tuition is $3.00 for a semester, which lasts 12 weeks.

Free Course In Electroplating for Brooklyn, N. Y.

The course of study in electroplating given at the Fort Greene Evening High School, 29 Fort Greene Place, Brooklyn 17, New York (formerly Brooklyn Evening Technical High School) will begin its Spring term on February 1, 1961.

The session is divided into classroom discussion and laboratory experiments. The classroom topics will include simple calculation, reading graphs, chemistry of the plating tank, pH, wetting agents, pitting, deionizing. The laboratory experiments will include solution analysis, Hull cell studies, anodizing.

Registration begins January 25, 1961, and is held daily thereafter, from 7:00 to 8:30 P.M. Classes will meet on Mondays and Wednesdays from 6:45 to 8:15 P.M., including

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about 6 Fridays. The term begins February 1 and ends June 28, 1961. Register with L. Serota in Rooms BW17 or 3E12.

MEETINGS

A. E. S. Midwest Region Holds Second Conference In South Bend

An all-day conference sponsored by the Midwest Region, A.E.S., was held on October 29 at the University of Notre Dame. The meeting attracted about 200 members and guests from Iowa, Illinois, Wisconsin, Indiana, Ohio, Michigan, New York and New Jersey. All A.E.S. national officers were present.

In the morning educational session E. A. Hardy, Travelers Insurance Co., spoke on "Plating Room Safety." Robert L. Giesel, Adolph Plating Co., discussed "Personnel in Plating." After lunch, A.E.S. President Wesley introduced all the A.E.S. national officers. L. L. Diveley, president of the Midwest Regional Council, reviewed the history of the Council and discussed future plans (Fig. 1).

Afternoon workshop question-and-answer sessions were held on "Mechanical Finishing," moderated by Chester G. Borlet (Fig. 2); "Plating," moderated by Manuel Ben (Fig. 3); and "Organic Finishing," moderated by R. D. Wysong (Fig. 4).

There were several displays of plated and finished products on exhibit.

(continued)

Fig. 1—L. L. Diveley, Cutler-Hammer, Inc., announced that the 1961 Regional Conference would be held in the Chicago area.

Fig. 2—Moderator and panel members for workshop on "Mechanical Finishing." Shown (left to right) are: Chester G. Borlet, Grand Rapids Brass Co.; W. L. Morgan, Hanson-Van Winkle-Munning Co.; Harry E. Welker, Guide Lamp Div., G. M. C.; L. R. Davidson, Grav-I-Flo Corp.; Robert Wesler, Acme Mfg. Co.; C. W. Kennedy, American Buffing & Processing.

A.E.S. Midwest Regional Conference . . .

Fig. 3—The workshop on "Plating" was conducted by Manuel Ben (standing). Panel members are (left to right): John B. Winters, Incar, Inc.; Dr. H. J. Wiesner, Bendix Products Div.; John Hunt, Du-Tone Chemical Co.; Donald Morris, Hanson-Van Winkle-Munning Co.

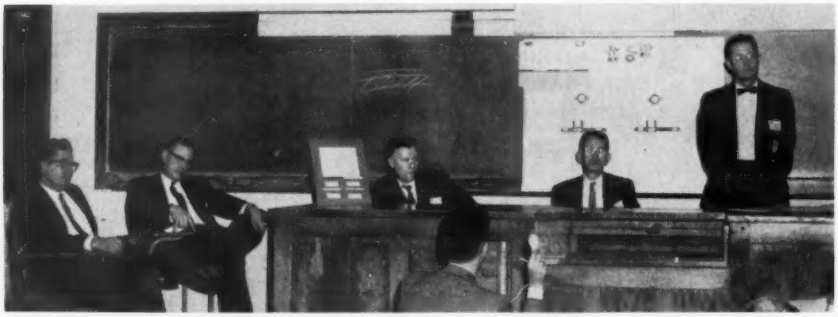

Fig. 4—Panel members and moderator for workshop on "Organic Finishing." Shown (left to right) are Peter Iwema, E. I. du Pont de Nemours & Co.; Bernard C. Case, Sunbeam Corp.; J. M. Andrus, Croname, Inc.; John Holland, Arvin Industries, Inc.; R. D. Wysong, Studebaker-Packard Corporation, past president of A.E.S., who served as moderator.

Fig. 5—Following the conclusion of the all-day conference, the representatives of branches comprising the Midwest Regional Council held a meeting to make plans for the 1961 conference sponsored by the region. (PRODUCTS FINISHING Staff Photographs.)

Tri-State A.E.S. Annual Meeting on February 4 in Columbus, Ohio

The Columbus Branch of the American Electroplaters' Society will host the Tri-State regional meeting and technical conference on February 4, 1961 at the Deshler Hilton Hotel. Members of branches from Cincinnati, Dayton, Indianapolis, Louisville and Columbus will attend.

The meeting will begin at 10 A.M. with educational sessions, and will include presentation of five papers by experts from various companies.

The meeting will conclude with a cocktail party, banquet, floor show and dancing in the evening.

Tickets may be secured from P. James Grote, 3513 Roswell Drive, Columbus 13, Ohio.

NECROLOGY

William F. Newbery

William F. Newbery, vice president of Detrex Chemical Industries, Inc., died on October 9.

MEETINGS of INTEREST to FINISHERS

Dec. 16-17. Annual Educational Session and Christmas Banquet, Newark Branch, A.E.S., Robert Treat Hotel, Newark, N. J.

Jan. 17-18. Annual Meeting and Conference, Society of Vacuum Coaters, Lake Towers Motel, Chicago, Ill.

Jan. 21. Annual Educational Session and Banquet, Symposium on Quality Control, Grand Rapids Branch, A.E.S., Pantlind Hotel, Grand Rapids, Mich.

Jan. 27-28. Annual Educational Session and Dinner Dance, Cleveland Branch, A.E.S., Technical Center, Cleveland Engineering Society, and Hotel Carter.

Jan. 28. Annual Meeting and Banquet, Chicago Branch, A.E.S., Conrad Hilton Hotel.

Feb. 3-4. Third Annual Dixie Regional Technical Session, Hotel Roanoke, Roanoke, Va. Blue Ridge Branch is host.

Feb. 4. Annual Educational Session and Banquet, New York Branch, A.E.S., Hotel Statler-Hilton, New York, New York.

Feb. 4. Annual Educational Session and Banquet, Saginaw Valley Branch, A.E.S., Frankenmuth, Mich.

Feb. 4. Seventh Annual Tri-State Regional Meeting, A.E.S., Deshler-Hilton Hotel, Columbus, Ohio. Columbus Branch is host.

Feb. 11. Eighth Interim Meeting, A.E.S. National, Statler Hotel, Hartford, Conn. New England Regional Council is host.

Feb. 18. Educational Session and Dinner-Dance, San Francisco Branch, A.E.S., Jack Tar Hotel, San Francisco.

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Metals Memos

News about metals and metal products . . .

Bright Body From Stainless Steel

An unusual Thunderbird recently rolled off the regular assembly line at Ford Motor Company's Wixom plant near Detroit. It has a bright, gleaming metallic-looking body of unprotected stainless steel.

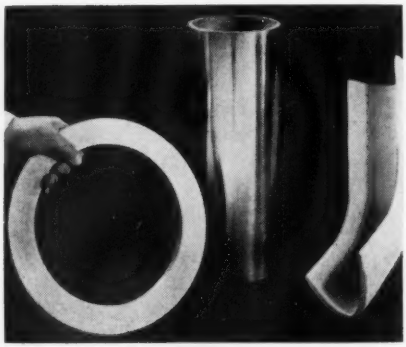
The body was stamped out by Budd Company in Philadelphia, fabricator of bodies for Thunderbird cars, using standard dies and fixtures. Ford assembled the body and put it over the normal Thunderbird running gear and frame.

Allegheny Ludlum Steel Corporation supplied the stainless steel and had the car built. It will be used as a display in auto shows and industrial exhibits to demonstrate the long-lasting qualities of unprotected stainless steel.

New Nickel: Pressed, Porous Sintered Shapes

Cormet A, a pressed and sintered porous nickel, is now being produced by Corning Glass Works, Corning, N. Y. It withstands temperatures up to 575 deg. F., can be fabricated into various shapes.

One use for the new material is for



conveyors that carry sensitive materials that are damaged by contact. In this application, the sensitive materials ride along on a cushion of air that is forced through the pores of the porous nickel. As a non-contacting chute for transferring molten glass, for example, the porous nickel withstands the high temperatures and protects the glass from "chute marks." Other uses include conveying camera and X-ray film, gelatinized paper, plastics and other products that have surface sensitivity.

1960 Article Index

Articles published in PRODUCTS FINISHING during 1960, classified by subject

ABRASIVES
Longer Life for Coated Abrasives ..... Feb., p. 35

ALUMINUM
Adams and Westlake's "Stoppage-Proof" Anodizing System—
Jack W. Petersen ..... Jan., p. 32
Techniques for Coloring Anodized Aluminum—R. V. Vanden Berg ..... Feb., p. 24
Techniques for Coloring Anodized Aluminum—R. V. Vanden Berg ..... Mar., p. 32
Aluminum Bus Bar Cuts Cost for Anodizer ..... Mar., p. 62
Finishing Appliance and Automotive Trim—
Gerard H. Poll, Jr., Associate Editor ..... June, p. 36
Douglas Aircraft Installs Large Hard-Coat Anodizing System ..... Dec., p. 58

ANODIZING
Adams and Westlake's "Stoppage-Proof" Anodizing System—
Jack W. Petersen ..... Jan., p. 32
Techniques for Coloring Anodized Aluminum—R. V. Vanden Berg ..... Feb., p. 24
Techniques for Coloring Anodized Aluminum—R. V. Vanden Berg ..... Mar., p. 32
Aluminum Bus Bar Cuts Cost for Anodizer ..... Mar., p. 62
Formation of Hard Films on Zinc and Zinc Alloys by Electrolytic Processes .. Apr., p. 72
Finishing Appliance and Automotive Trim—
Gerard H. Poll, Jr., Associate Editor ..... June, p. 36
Douglas Aircraft Installs Large Hard-Coat Anodizing System ..... Dec., p. 58

BAKING
Flow Coat Finishing of Steel Roof Deck—Ezra A. Blount, Editor ..... Jan., p. 20
Ceramic Infrared: New Oven Cuts Paint-Baking Time ..... Jan., p. 54
Painting Assembled Aircraft—Ogle French ..... Mar., p. 50
Electrostatic Spray Improves Quality, Lowers
Painting Costs on Appliances ..... Apr., p. 50
A More Versatile Source of Infrared Heat—W. H. Tomb ..... May, p. 66
Infrared Ovens for Baking Paint on Railroad Cars ..... May, p. 91
Finishing Appliance and Automotive Trim—
Gerard H. Poll, Jr., Associate Editor ..... June, p. 36
Koch Uses Hand-Held Electrostatic Gun To Coat
Brass Furniture—D. F. Nuebling ..... June, p. 72
Fast-Dry Paint Speeds Car Refinishing ..... July, p. 92
Cutler-Hammer: A Plant Designed with the Finishing Department
in Mind—Ezra A. Blount, Editor ..... Sept., p. 38
How Westinghouse Paints Circuit Breakers—
E. J. Gagliardi and W. W. Webber ..... Sept., p. 68
Custom Coater Applies Catalyzed and Plastisol Coatings ..... Oct., p. 86
Overhead Conveyor Eliminates Painting Bottleneck—Roy R. Hill ..... Nov., p. 52
Infrared Oven Speeds Production ..... Nov., p. 86
Stran-Steel's Color Coating Process—Gerard H. Poll, Jr., Associate Editor .. Dec., p. 30
Infrared Oven Speeds Finishing of Kitchen Cabinet Doors ..... Dec., p. 56

BARREL FINISHING
Smoothing Off Clock Parts ..... Feb., p. 50
What Precision Barrel Finishing Can Do—J.J. Forrester, Jr. ..... Mar., p. 54

(continued)

How Pesco Products Improved Deburring ..... Mar., p. 64
How C. W. M. Electroplaters Reduced Manual Handling—
Francis Magnuson and Marty LeClair ..... Aug., p. 68
Vibratory Finishers for Deburring ..... Nov., p. 84

BLAST CLEANING

Wet Blasting: A Versatile Finishing Method ..... Jan., p. 58

BLASTING

Wet Blasting: A Versatile Finishing Method ..... Jan., p. 58
Blast Barrel Aids Spring Manufacturer ..... Nov., p. 88

BRIGHT DIPPING

Add Color to Your Zinc Plate—Lyne S. Metcalfe ..... Nov., p. 62

BRUSHING

Can Power Brushing Help You In Finishing? ..... Apr., p. 36

BUFFING

Improved Buffing Techniques—James A. Badaluco, W. L. Morgan,
Paul A. Waalkes, Ezra A. Blount, Editor ..... May, p. 46
Improved Buffing Techniques—James A. Badaluco, W. L. Morgan,
Paul A. Waalkes, Ezra A. Blount, Editor ..... June, p. 58
Finishing Appliance and Automotive Trim—
Gerard H. Poll, Jr., Associate Editor ..... June, p. 36
Finishing Flatware—Daniel Gray ..... Aug., p. 44
How to Train Buffing Foremen and Operators—Harry E. Welker ..... Nov., p. 44

CADMIUM PLATING

Cutler-Hammer: A Plant Designed with the Finishing Department
in Mind—Ezra A. Blount, Editor ..... Sept., p. 38

CHEMICAL MILLING

Chemical Milling at Work—Lew B. Stearns ..... July, p. 72

CHROMIUM PLATING

Current Practice in Plating Zinc Die Castings,
An Interview with W. H. Safranek ..... July, p. 66
Fizzing Tablets Remedy Plating Headaches ..... Oct., p. 94
Control of Chromium Plating Baths—Joseph P. Branciaroli ..... Dec., p. 50

CLEANING

Washer Cleans Parts in Tote Boxes ..... May, p. 51
Bicycle Maker Solves Rusting Problem ..... May, p. 51
New Finishing Line Speeds Production of Conduit ..... May, p. 81
How C. W. M. Electroplaters Reduced Manual Handling—
Francis Magnuson and Marty LeClair ..... Aug., p. 68
Cutler-Hammer: A Plant Designed with the Finishing Department
in Mind—Ezra A. Blount, Editor ..... Sept., p. 38
Five-Stage Cleaning Beats "Burn-Off" for Economy ..... Dec., p. 100

CONTROL

Control of Chromium Plating Baths—Joseph P. Branciaroli ..... Dec., p. 50

CONVENTIONS, EXPOSITIONS, TECHNICAL SOCIETY MEETINGS

Finishing-Industry Interviews—Ezra A. Blount, Editor ..... Jan., p. 38
Painters' Problems: A Panel Discussion ..... June, p. 50
A. E. S. Los Angeles Convention ..... June, p. 84
Program for 47th Annual Convention, American Electroplaters' Society ..... July, p. 38
A. E. S. Convention Review ..... Sept., p. 58
Editor on Tour: Los Angeles to Tokyo—Ezra A. Blount, Editor ..... Sept., p. 82
Editor on Tour: Tokyo and Nagoya—Ezra A. Blount, Editor ..... Oct., p. 72
Editor on Tour: Nagoya, Japan—Ezra A. Blount, Editor ..... Nov., p. 72
Editor on Tour: Osaka, Japan; Taipei, Taiwan (Formosa); Hong Kong;
Tokyo, Japan—Ezra A. Blount, Editor ..... Dec., p. 66

CONVEYORS

Overhead Conveyor Eliminates Painting Bottleneck—Roy R. Hill ..... Nov., p. 52

DEBURRING

Can Power Brushing Help You In Finishing? ..... Apr., p. 36
Cob Grits Aid Plastic Flash Removal ..... June, p. 45

DRYING
Stain-Free Drying of Metal Parts—Edward Plassmeyer ..... Dec., p. 62
ELECTROSTATIC SPRAYING
Electrostatic Spray Improves Quality, Lowers Painting Costs on Appliances ..... Apr., p. 50
Koch Uses Hand-Held Electrostatic Gun to Coat Brass Furniture—D. F. Nuebling ..... June, p. 72
What Vacuum Metallizers Should Know About Electrostatic Spraying—John Scharnberg and T. E. Hayden ..... Aug., p. 58
Electrostatic Painting: What It Is, What It Can Do—James H. Rice ..... Oct., p. 52
Electrostatic Hand Guns Aid Furniture Manufacturer ..... Nov., p. 60
ENAMEL AND LACQUER APPLICATION
Painting Assembled Aircraft—Ogle French ..... Mar., p. 50
Traveling-Booth Paint Shop at Bell Helicopter Cuts Painting Time ..... Mar., p. 58
Electrostatic Spray Improves Quality, Lowers Painting Costs on Appliances ..... Apr., p. 50
New Finishing Line Speeds Production of Conduit ..... May, p. 81
Finishing Appliance and Automotive Trim—Gerard H. Poll, Jr., Associate Editor ..... June, p. 36
Accent on Corrosion-Proofing ..... July, p. 60
What Vacuum Metallizers Should Know About Electrostatic Spraying—John Scharnberg and T. E. Hayden ..... Aug., p. 58
How C. W. M. Electroplaters Reduced Manual Handling—Francis Magnuson and Marty LeClair ..... Aug., p. 68
How to Finish Magnesium—Dr. John A. Stevens ..... Aug., p. 74
Cutler-Hammer: A Plant Designed with the Finishing Department in Mind—Ezra A. Blount, Editor ..... Sept., p. 38
How Westinghouse Paints Circuit Breakers—E. J. Gagliardi and W. W. Webber ..... Sept., p. 68
2400 Pails Per Hour by Airless Spray ..... Oct., p. 84
Overhead Conveyor Eliminates Painting Bottleneck—Roy R. Hill ..... Nov., p. 52
Stran-Steel's Color Coating Process—Gerard H. Poll, Jr., Associate Editor ..... Dec., p. 30
EXHAUST FUMES
Plastic Duct Carries Hot, Corrosive Fumes ..... Feb., p. 46
FINISHING COSTS
Should A Manufacturer Do His Own Plating?—Curtis M. Varland, Herman Schnurr, Daniel Gray ..... Apr., p. 56
FINISHING SYSTEMS
Flow Coat Finishing of Steel Roof Deck—Ezra A. Blount, Editor ..... Jan., p. 20
New Finishing System Automatically Paints Automobile Frames ..... Feb., p. 40
Painting Assembled Aircraft—Ogle French ..... Mar., p. 50
Traveling-Booth Paint Shop at Bell Helicopter Cuts Painting Time ..... Mar., p. 58
Production Lines Keep Rolling During Modernization Program ..... Apr., p. 64
Accent on Corrosion-Proofing ..... July, p. 60
New Complete Finishing System ..... July, p. 84
Cutler-Hammer: A Plant Designed with the Finishing Department in Mind—Ezra A. Blount, Editor ..... Sept., p. 38
Overhead Conveyor Eliminates Painting Bottleneck—Roy R. Hill ..... Nov., p. 52
Electrostatic Hand Guns Aid Furniture Manufacturer ..... Nov., p. 60
Infrared Oven Speeds Production ..... Nov., p. 86
Stran-Steel's Color Coating Process—Gerard H. Poll, Jr., Associate Editor ..... Dec., p. 30
Douglas Aircraft Installs Large Hard-Coat Anodizing System ..... Dec., p. 58
GALVANIZING
Pretreatment Makes Welding Galvanized Parts Easy ..... Feb., p. 50
Radiant Firing Lengthens Life of Galvanizing Kettle—Joseph Atkinson ..... Nov., p. 56
GAS PLATING
Vapor-Deposition Method Produces Adherent Tungsten Coatings ..... June, p. 90
New Gas Deposition Process for Making Dies ..... Nov., p. 66
(continued)

HOT SPRAY
2400 Pails Per Hour by Airless Spray ..... Oct., p. 84
INDUSTRIAL RESEARCH
European Paint-Hardness Testers Versus the Sward Rocker—
Marcel Dierckx ..... May, p. 52
MAGNESIUM
How to Finish Magnesium—Dr. John A. Stevens ..... Aug., p. 74
MASKING MATERIALS AND METHODS
Fast-Dry Paint Speeds Car Refinishing ..... July, p. 92
METALLIC COATINGS
Gold Coatings Protect Vital Missile Components ..... May, p. 50
NICKEL PLATING
Bright Nickel Baths—Dr. Nelson F. Murphy ..... Feb., p. 62
Nickel Bath with Good Tolerance for Impurities ..... Mar., p. 45
Current Practice in Plating Zinc Die Castings,
An Interview with W. H. Safranek ..... July, p. 66
ORGANIC COATINGS
Polysulfide-Epoxy Coatings Solve Abrasion and Corrosion
Problem on Hopper Cars ..... Feb., p. 52
Sprayable Vinyl Coatings ..... Apr., p. 32
Vinyl Paint Makes Steel Hulls Practical for Pleasure Boats ..... June, p. 46
Painters' Problems: A Panel Discussion ..... June, p. 50
Gold Silicone Finish Protects Space Heater ..... Nov., p. 66
PAINT REMOVAL
Paint Stripping Technology Today—L. J. Durney ..... Mar., p. 39
PAINTING FACILITIES
Flow Coat Finishing of Steel Roof Deck—Ezra A. Blount, Editor ..... Jan., p. 20
Production Lines Keep Rolling During Modernization Program ..... Apr., p. 64
New Complete Finishing System ..... July, p. 84
Stran-Steel's Color-Coating Process—Gerard H. Poll, Jr., Associate Editor .. Dec., p. 30
PHOSPHATIZING
Flow Coat Finishing of Steel Roof Deck—Ezra A. Blount, Editor ..... Jan., p. 20
Painters' Problems: A Panel Discussion ..... June, p. 50
Accent on Corrosion-Proofing ..... July, p. 60
New Complete Finishing System ..... July, p. 84
Cutler-Hammer: A Plant Designed with the Finishing Department
in Mind—Ezra A. Blount, Editor ..... Sept., p. 38
How Westinghouse Paints Circuit Breakers—
E. J. Gagliardi and W. W. Webber ..... Sept., p. 68
PLASTIC COATINGS
A Review of Solventless Coating with Plastics—Hans K. Neumann ..... Feb., p. 36
Sprayable Vinyl Coatings ..... Apr., p. 32
Custom Coater Applies Catalyzed and Plastisol Coatings ..... Oct., p. 86
PLATING
Should A Manufacturer Do His Own Plating?—
Curtis M. Varland, Herman Schnurr, Daniel Gray ..... Apr., p. 56
Finishing Appliance and Automotive Trim—
Gerard H. Poll, Jr., Associate Editor ..... June, p. 36
Current Practice in Plating Zinc Die Castings,
An Interview with W. H. Safranek ..... July, p. 66
PLATING EQUIPMENT AND FACILITIES
Titanium Racks and Hooks for Plating and Anodizing ..... June, p. 76
Editor on Tour: Los Angeles to Tokyo—Ezra A. Blount, Editor ..... Sept., p. 82
Is Your Plating Rectifier Defective?—Robert J. Darrah ..... Oct., p. 44
Editor on Tour: Tokyo and Nagoya—Ezra A. Blount, Editor ..... Oct., p. 72
Polyester-Glass Coating Saves Corroded Ductwork ..... Nov., p. 70
Editor on Tour: Nagoya, Japan—Ezra A. Blount, Editor ..... Nov., p. 72
Editor on Tour: Osaka, Japan; Taipei, Taiwan (Formosa); Hong Kong;
Tokyo, Japan—Ezra A. Blount, Editor ..... Dec., p. 66

PLATING RESEARCH
Bright Nickel Baths—Dr. Nelson F. Murphy ..... Feb., p. 62
Formation of Hard Films on Zinc and Zinc Alloys by Electrolytic Processes .. Apr., p. 72
Vapor-Deposition Method Produces Adherent Tungsten Coatings ..... June, p. 90
Pores in Plates: Causes and Detection ..... Oct., p. 96
Electrophoretic Deposition—Dr. Nelson F. Murphy ..... Dec., p. 94

POLISHING
Bumper Reconditioner Develops Improved Sanding Disc ..... Jan., p. 56
Flat Polishing: One Way to Beat Steel Shortage ..... Jan., p. 60
Can Power Brushing Help You In Finishing? ..... Apr., p. 36
Finishing Flatware—Daniel Gray ..... Aug., p. 44

PORCELAIN ENAMELING
Porcelain Enamel Adherence Studies—Dr. Nelson F. Murphy ..... Aug., p. 90

SILVER PLATING
Finishing Flatware—Daniel Gray ..... Aug., p. 44

SPRAYING
Sprayable Vinyl Coatings ..... Apr., p. 32
New Complete Finishing System ..... July, p. 84
Fast-Dry Paint Speeds Car Refinishing ..... July, p. 92
How Westinghouse Paints Circuit Breakers—
E. J. Gagliardi and W. W. Webber ..... Sept., p. 68
Custom Coater Applies Catalyzed and Plastisol Coatings ..... Oct., p. 86

SUPERVISION
Should a Manufacturer Do His Own Plating?—
Curtis M. Varland, Herman Schnurr, Daniel Gray ..... Apr., p. 56
How to Train Buffing Foremen and Operators—Harry E. Welker ..... Nov., p. 44

SURFACE CONVERSION COATINGS
Traveling-Booth Paint Shop at Bell Helicopter Cuts Painting Time ..... Mar., p. 58
How to Finish Magnesium—Dr. John A. Stevens ..... Aug., p. 74
Add Color to Your Zinc Plate—Lyne S. Metcalfe ..... Nov., p. 62

TESTING
European Paint-Hardness Testers Versus the Sward Rocker—
Marcel Dierckx ..... May, p. 52
A Rapid Method for Analyzing Wastes ..... June, p. 45
Is Your Plating Rectifier Defective?—Robert J. Darrah ..... Oct., p. 44
Pores in Plates: Causes and Detection ..... Oct., p. 96
Control of Chromium Plating Baths—Joseph P. Branciaroli ..... Dec., p. 50

TITANIUM
Titanium Racks and Hooks for Plating and Anodizing ..... June, p. 76

TRAINING COURSES
Training Courses in Finishing ..... Sept., p. 94

VACUUM METALLIZING
More Metallized Trim on Automotive Interiors ..... Jan., p. 52
Metallizing Process Produces Thick Films of Titanium—
David K. Wilburn and Charles W. Horn ..... May, p. 90
Vacuum Metallizing: New Developments, New Uses ..... Oct., p. 60

WASTE DISPOSAL
A Rapid Method for Analyzing Wastes ..... June, p. 45
Cutler-Hammer: A Plant Designed with the Finishing Department
in Mind—Ezra A. Blount, Editor ..... Sept., p. 38

WATER TREATMENT
Adams and Westlake's "Stoppage-Proof" Anodizing System—
Jack W. Petersen ..... Jan., p. 32

ZINC PLATING
New Finishing Line Speeds Production of Conduit ..... May, p. 81
Cutler-Hammer: A Plant Designed with the Finishing Department
in Mind—Ezra A. Blount, Editor ..... Sept., p. 38

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DECEMBER ADVERTISERS' INDEX

Acme Mfg. Co. 101
Agate Lacquer Mfg. Co., Inc. 167
Allied Finishing Specialties Co. 122
Allied Research Products, Inc. 18, 19
Amchem Products, Inc. 10, 11
Amercoat Corp. 95
American Machine and Metals, Inc., DeBothezat Fans Div. 129
American Metal Climax, Inc., Amco Div. 73
Anaconda American Brass Co. 125
Atlas Powder Co., Chemicals Div. 12

Belke Mfg. Co. 137
Better Finishes & Coatings, Inc. 99
Blakeslee & Co., G. S. 175
Bond Chemical Products Co. 155
Brady Co., W. H. 128
Bruce Products Co. 160
Burdett Mfg. Co. 9

Cincinnati Cleaning & Finishing Machinery Co. ..... Second Cover
Cohn Mfg. Co., Inc., Sigmund 110
Conversion Chemical Corp. 133
Cowles Chemical Co. 28
Crescent Bronze Powder Co. 161

DeBothezat Fans Div., American Machine and Metals, Inc. 129
Delavan Mfg. Co. 114
Despatch Oven Co. 123
Detrex Chemical Industries, Inc. 21
Detro Mfg. & Sales Co., Inc. 142
DeVilbiss Co. 80, 81
Diamond Alkali Co. 8, 112, 113
Diversey Corp. 61
Drying Systems Co. 146
DuBois Chemicals, Inc. 118
Dytex Chemical Co. 157

Electro-Glo Co. 130
Engelhard Industries, Inc. 13
Enthone, Inc. 103

Federated Metals Div., American Smelting & Refining Co. 83
Formax Mfg. Corp. 92
Fortune Industries, Inc. 144

Hammond Machinery Builders, Inc. 7
Hanson-Van Winkle-Munning Co. 22, 23, 91
Harper Buffing Machine Co. 107
Harshaw Chemical Co. 25
Heatbath Corp. 116
Hubbard-Hall Chemical Co. 109
Hull & Co., Inc., R. O. 3

Ideal Chemical Co. 162
Industrial Filter & Pump Mfg. Co. 121

Kirk & Blum Mfg. Co. 24
Koch Sons, Inc., George 143
Kushner Electroplating School 160

Lanly Co. 131
Lasalco, Inc. 27
Lea Mfg. Co. 134
Lindberg Products Co. 162

MacDermid, Inc. ..... Third Cover
Magnus Chemical Co., Inc. 93
Mahon Co., R. C. 16, 17
Mayer Refrigerating Engineers, Inc. 154
Merit Products, Inc. 4
Metal Finish, Inc. 141
Metalwash Machinery Corp. 97
Microbeads, Inc. 111
Midland Industrial Finishes Co. 98
Morse Mfg. Co., Inc. 162
Munray Div., Textron, Inc. 126

Nikolas & Co., Inc., G. J. 26
Northwest Chemical Co. 85

Oakite Products, Inc. 1

Pennsalt Chemicals Corp. 89
PRODUCTS FINISHING DIRECTORY 127

Ramco Equipment Corp., Div. of Randall Mfg. Co., Inc. 6
Ransburg Electro-Coating Corp. 2
Ransohoff/Roto-Finish 135
Rapid Electric Co. 139
Research Products Corp. 104, 120
Rona Pearl Corp. 136

Sarco Co., Inc. 105
Schlegel Mfg. Co. 117
Sel-Rex Corp. 115
Sethco Mfg. Co. 60
Simplicity Engineering Co. 108
Solvents & Chemicals Group 48, 49
Spee-Flo Co. 145
Spra-Con Co. 119
Spraying Systems Co. 106
Steinen Mfg. Co., Wm. 149
Stevens, Inc., Frederic B. 14, 15
Sulphur Products Co., Inc. 164
Sundstrand Corp. 71
Sylvania Electric Products, Inc. 65

Technic, Inc. 20
Tenax Finishing Products Co. 164
Ti-Co Industries, Inc. 163
True Brite Chemical Products Co. 148
Turco Products, Inc. ..... Fourth Cover

Udylite Corp. 75, 77, 79
Unit Process Assemblies, Inc. 150
Univertical Corp. 147
U. S. Stoneware Co. 87

Vanton Pump Div., Cooper Alloy Corp. 96, 140, 160
Varnish Products Co. 132

Wilder Mfg. Co., Inc. 163
Wyandotte Chemicals Corp. 69

Young Bros. Co. 138

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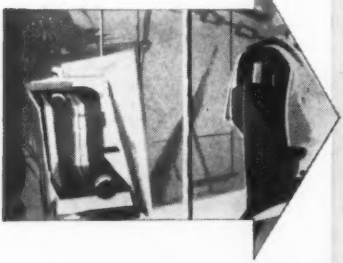

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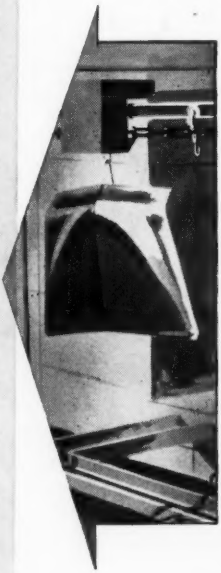

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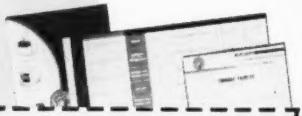

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